1982
DEPARTMENT OF ENERGY AUTHORIZATION

(Environmental Research, Environmental Compliance, and Environmental Safety)

HEARING

BEFORE THE

SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURE RESEARCH AND ENVIRONMENT

OF THE

COMMITTEE ON SCIENCE AND TECHNOLOGY U.S. HOUSE OF REPRESENTATIVES

NINETY-SEVENTH CONGRESS

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MARCH 13, 1981

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*On assignment to Budget Committee for 97th Congress.

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March 13, 1981:

Alex G. Fremling, Acting Assistant Secretary for Environmental Protection, Safety, and Emergency Preparedness, Department of Energy; and N. Douglas Pewitt, Acting Director, Office of Energy Research, Department of Energy; accompanied by William Burr, Deputy Assistant Secretary for Research; Delmar Mayhew, Director, Financial Services Division; and Charles Edington, Acting Director, Office of Health and Environmental Research 15

1982 DEPARTMENT OF ENERGY AUTHORIZATION

FRIDAY, MARCH 13, 1981

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE AND TECHNOLOGY,
SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURE RESEARCH AND ENVIRONMENT,
Washington, D.C.

The subcommittee met, pursuant to call, at 10:08 a.m., in room 2318, Rayburn House Office Building, Hon. James M. Scheuer (chairman of the subcommittee) presiding.

Present: Representatives Scheuer, Carney, and Sensenbrenner.

Mr. SCHEUER. The subcommittee will come to order.

Today we begin our subcommittee's formal consideration of the Department of Energy's fiscal year 1982 budget request for environmental research, environmental compliance, and environmental safety.

At a later date we will hold an additional day or more of hearings with Departmental and public witnesses in which we will examine the impact of the reorganization of the environmental programs along with other substantive issues.

The President's program for the national economic recovery has proposed several significant budgetary restraints on many activities of the Federal Government, including the programs of the Department of Energy.

We applaud these efforts to reduce unnecessary and duplicative efforts. However, we must carefully examine these proposals to see if they are compatible with the subcommittee's perception of the Nation's needs. Therefore, the choices we have to make are neither easy nor simple. To illustrate this concern, I need only point to the potentially adverse effects on our environment and on our health that is threatened by our crash program to achieve independence from foreign energy sources and, in particular, from Persian Gulf oil, by developing a crash program to produce alternative energy sources.

In 1980 the United States spent about $80 billion for imported oil, up from $3 billion a decade ago. It is contemplated that in the next year we'll be spending over $100 billion for foreign oil.

In fiscal 1982, our Government plans to spend approximately $9 million for energy alternatives such as synfuels, coal conversion, nuclear power, and others.

It seems to me, that we ought to be able to spend 2 or 3 percent of that amount to make sure that this crash program to free ourselves from a dependence on Persian Gulf oil does not result in serious threats either to our health or to our environment. To say

that we can't afford 2 or 3 percent, which is far less than most successful corporations spend of their gross earnings on R. & D., is simply not acceptable.

We must strive to make decisions that will be beneficial to the economy, beneficial to our environment, and beneficial to our health.

For many years we enjoyed relatively clean and safe sources of energy. Of course, now we find ourselves becoming increasingly reliant on new technologies which have uncertain and perhaps threatening environmental and health consequences. We are confronted with sterile land from strip mining, dying lakes from acid rain, tons of sludge from coal flue scrubbers which produces increasing levels of respiratory ailments among infants and the elderly. We have seriously flawed and therefore nonproductive nuclear reactors which are nonfunctioning. We are faced with no permanent solution in sight to the problem of nuclear waste disposal, and for those of us who believe that the nuclear option is one that must be seized, this is a matter of continuing frustration. All of these problems are exacerbated to some extent, at least, by the inadequate level of research and development.

So as our country turns to different forms of energy, we must become concerned with the environmental and health impacts of each. Of course, it's easy to say that the solution is to utilize clean and safe energy, but the process of getting there and achieving it is difficult, time-consuming, complicated, and expensive, because research and development are all of these things.

So this brings us to the purpose of this hearing, which is to examine critically the health and environmental programs of DOE and how they should properly relate to DOE's mission.

Now, as to a matter of organization and reorganization. The administrative reorganization of February 18 of this year in DOE divided the duties of the Assistant Secretary for Environment into two different divisions. Health and Environmental Research is now a part of the Office of Energy Research, while environmental overview, compliance and safety programs are scheduled to be part of the Office of the Assistant Secretary for Environmental Protection, Safety, and Emergency Preparedness.

This reorganization immediately raises questions regarding the kind of cooperation and coordination that we can expect between these two offices, as well as the role of environmental research in the Department's decisionmaking process and its conduct of ongoing development programs.

When I voiced concern on these matters to Secretary Edwards at his appearance before the full Science and Technology Committee on February 17, he replied,

> We are going to protect the environment to the best of my ability as we move forward and find answers to the energy problems facing this country.

It was a very firm, very forthright assurance. We were heartened by the remarks.

The Secretary went on to indicate that the Department would put more emphasis on and more funds into environmental research.

Today we look forward to hearing how the Department plans to implement this philosophy. We look forward very much to the testimony.

Now, at this time, before we call on the first witness, I would like to recognize my distinguished colleague from New York, Congressman William Carney, the ranking minority member of this subcommittee, for any remarks he may wish to make.

Mr. CARNEY. Thank you very much, Mr. Chairman.

Today we end our first round of hearings on the Reagan budget proposals. It is obvious to me and to many, from what we have seen and heard this week, that a great deal of time and thought has gone into these proposals. I cannot say that I will be able to support all the proposals before us, but I trust that most of them will be approved by our committee when we begin to mark up bills in the near future.

The proposal before us today is an example of the type of tough budget decisions that face this committee, the Congress, and the American people, as we attempt to escape an economic holocaust. This year, in fiscal year 1981, the Department of Energy programs under the jurisdiction of this subcommittee will expend a grand total of $281,694,000. In the fiscal year 1982 budget proposed by President Reagan, there is $281,300,000, which is 99.9 percent of the level of this year.

In the best of worlds, I would want to see our expenditures in this area increased. We are spending vast sums in the development of new energy sources and I and other conservationists want to make sure that we devote sufficient resources to environmental protection.

All week we have been hearing stories of program cuts. Yesterday NOAA reported a multimillion dollar project which was zeroed out. The day before the EPA came before us and reported on entire laboratories which are scheduled for closure, and their research programs canceled.

These are tough cuts to make, and in many cases they will be difficult cuts to absorb. But there is a growing realization that we must steel ourselves to the task ahead. We face a period of stunning change in our society, unlike anything since the end of the Great Depression and the early days of the New Deal. There is a new mood in the Nation, a rejection of the "business as usual" attitude. My constituents, and taxpayers all across America, are demanding a basic reexamination of public policies and fundamental changes in the course of government. We must regain control of the economy and we must return control of our economic health to the taxpayers, and we must face up to the responsibility we hold under the Constitution to determine the future of our Nation. I know that is what my constituents are calling for today.

Mr. Chairman, I share your concern for the environment, and I am pleased that, at a time when the Department of Energy is suffering cuts in many programs, we find the environmental programs have escaped the budget ax virtually unscathed.

Thank you, Mr. Chairman.

Mr. SCHEUER. Thank you very much, Mr. Carney.

Now I would like to welcome Mr. Alex Fremling, Acting Assistant Secretary for Environmental Protection, Safety, and Emergen-

cy Preparedness, and also Dr. Douglas Pewitt, Acting Director of the Office of Energy Research.

[The prepared statement of Mr. Fremling follows:]

STATEMENT OF ALEX G. FREMLING

ACTING ASSISTANT SECRETARY FOR ENVIRONMENTAL

PROTECTION, SAFETY, AND EMERGENCY PREPAREDNESS

DEPARTMENT OF ENERGY

BEFORE THE

SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURE RESEARCH

AND ENVIRONMENT

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HOUSE OF REPRESENTATIVES

MARCH 13, 1981

INTRODUCTION

Mr. Chairman, Members of the Subcommittee, I am pleased to be here today to present to you the Department of Energy's budget request for FY 1982 for the Environmental Overview and Assessment program. This program provides for the Department a comprehensive and effective program of environmental assessment and protection related to current and developing energy technologies, as well as other Departmental operations. The program is designed to meet the specific environmental responsibilities and functions assigned to the Department by the DOE Organization Act (Public Law 95-91) and the generic environmental responsibilities mandated by the National Environmental Policy Act (NEPA) and other environmental protection requirements required by Federal, State and local Government legislation. This office is also responsible for ensuring that the Department's ongoing operational activities are conducted in compliance with environmental, health and safety regulations.

This Overview and Assessment program uses research findings and comprehensively applies them to specific issues or situations of significant concern to energy development and use.

Department of Energy
FY 1982 Budget to Congress
Funding Summary
(Budget Authority in Millions)

	FY 1981	FY 1982		
	Appropriation	January Budget	March Budget	Change
Overview and Assessment				
Overview Management - NEPA	$ 5.7	$ 6.1	$ 3.0	$- 3.1
Environmental Assessments	16.7	18.5	12.0	- 6.5
Environmental and Safety Engineering	18.7	22.6	16.6	- 6.0
Operational and Environmental Safety	9.4	14.0	14.0	-
Subtotal - Operating Expenses	50.5	61.2	45.6	-15.6
- Capital Equipment	2.0	4.0	4.0	-
Total - Overview and Assessment	52.5	65.2	49.6	-15.6
Program Direction	11.1	10.7	10.7	-
Total	$ 63.6	$ 75.9	$ 60.3	$-15.6

The Overview and Assessment program ensures that DOE will adequately meet all environmental, health and safety (EH&S) requirements, current and future, in the formulation and implementation of energy policies, programs, and regulations. The functions in this program consist of: (a) overview, assessment and appraisal of DOE plans, programs, facilities and field operations to assure compliance with current and anticipated Federal, State and local regulations and standards; (b) issuance of internal Department of Energy EH&S policies and requirements; (c) development of compliance guidance and technical information for incorporation into Department planning and decisionmaking; and (d) support of Departmental programs in carrying out their EH&S compliance responsibilities. This responsibility is addressed through the following principal activities:

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NATIONAL ENVIRONMENTAL POLICY ACT PROGRAM

NEPA COMPLIANCE - The NEPA office is responsible for conducting the Department's NEPA compliance program, which supports the responsibilities of the Office of Environment as defined in the DOE Organization Act Section (203(a)(3)) and DOE's NEPA guidelines. These responsibilities involve the development of generic environmental policy and guidance and the review of specific DOE actions for compliance with NEPA and other related environmental statutes and regulations. This program is intended to assure that the Department meets national environmental protection goals while avoiding unnecessary legal delays in the development of energy initiatives and resources. Consideration of environmental factors early in the project planning process is an integral part of DOE's environmental compliance strategy to minimize delays and premature commitment of project resources, reduce the risk of litigation, and facilitate the project permitting process.

In 1981, the Department's NEPA staff:

- Will conduct 250-400 independent reviews of proposed DOE actions to determine the need for environmental assessments and environmental impacts statements. In addition, the NEPA staff will review about 200 formal environmental assessments and environmental impact statements and recommend approval or disapproval.
- Developed, with the Colorado Department of Natural Resources, a pilot state-managed program to streamline the environmental review activities for energy related projects.

ENVIRONMENTAL ASSESSMENTS PROGRAM

ENVIRONMENTAL ASSESSMENTS - The Environmental Assessments program evaluates how current and proposed environmental issues, laws, and regulations might affect energy development and use, and how energy plans and programs might affect the environment, health and safety of the country. Through different regulatory, technological, and regional assessments, this program analyzes comprehensively the environmental and socioeconomic impacts of energy plans, identifies potentially adverse impacts of promising energy technologies being developed by DOE, and proposes measures that could be useful in mitigating those impacts.

Analyses of the issues associated with developing energy technologies typically include air quality, water quality, and transportation. For example, assessments disclosed potential air emission problems associated with the increased use of fuel-efficient diesel engines in passenger car and light truck fleets. As a result, the Department initiated a program during FY 1980 to evaluate the potential health risks associated with diesel exhaust emissions. This program has also conducted an indepth analysis of the environmental and regulatory impacts of synthetic fuels development. In FY 1982, analyses will focus on the impact of the Clean Air Act, the Clean Water Act, and the Surface Mining Control and Reclamation Act on DOE's programs.

The assessments program also identifies potential environmental concerns associated with energy technologies early in the research and development stage and monitors the severity of these concerns as the technology development progresses. Information developed through this program is provided to the energy technology development programs to facilitate planning and management decisions on their future priorities and environmental acceptabilities. Early planning reduces the likelihood that adverse environmental effects will be discovered after costly

commitments have been made to a given technology. In addition to the above efforts, regional assessments are conducted to determine the impact of energy technologies and programs on land, water, and air quality on human health and safety and on social and economic systems within particular regions and states.

Accomplishments for this program include:

- An environmental and regulatory impact analysis of the proposals for a synthetic fuels development program was published.
- A comprehensive summary of the regulatory, environmental, energy and technical issues related to increased use of light-duty diesel engines was prepared. This provided a common data base for all agencies on what is and is not known.
- An analysis of the potential energy-related sources, atmospheric transport, deposition and effects of acid rain was prepared and issued.
- A comprehensive handbook that summarizes information on the environmental aspects of those energy technologies likely to be used in the U.S. during the next 20 years was issued.
- An assessment of the environmental, health, and socioeconomic impacts of large-scale deployment of solar energy systems was conducted.
- Environmental information handbooks were prepared on energy-related aspects of air quality, water resources, solid and hazardous wastes, and land use.

ENVIRONMENTAL AND SAFETY ENGINEERING PROGRAM

ENVIRONMENTAL AND SAFETY ENGINEERING - The environmental and safety engineering program provides the Office of Environmental Protection, Safety, and Emergency Preparedness the capability to make independent evaluations on environmental control and safety aspects of DOE's energy development program. Because environmental controls are those technologies (e.g., particulate control devices),

processes (e.g., waste water cleanup processes), and strategies (e.g., process modifications) that allow energy systems to operate under "real world" environmental constraints, this program contributes to the development of balanced DOE and Federal positions on a spectrum of environmental control, safety and energy system issues.

A major goal of the program is to collect new and confirmatory environmental control data in the laboratory and at field energy installations, and to evaluate objectively this data relative to existing and anticipated environmental control laws and regulations. The resulting unbiased evaluations are used to establish environmental, engineering and economic trade-offs among various environmental control options and energy technologies, with focus on considering the entire fuel cycle as a system. Since the program addresses environmental control considerations beyond routine compliance, the feasibility of advanced environmental control concepts that merit further development have also been identified on the basis of data collected.

Environmental and Safety Engineering also conducts the DOE program to identify environmental control and safety issues associated with storing, transporting, handling, and using liquefied gaseous fuels, such as LNG and LPG. Experimental tests conducted in this program have shown that heat radiation from LNG pool fires on water can approach levels up to twice those previously estimated. Moreover, recent LNG spill data collected in the program have confirmed the dependence of the vapor cloud dispersion on atmospheric conditions. This supports the need for improved dispersion models to reliably predict the fate and ultimate safety impact of a large LNG release. Additionally, recent experimental observations clearly indicate that the implications of the size of a LNG spill relative to safety considerations are not well understood. In particular, preliminary data suggest that the energy released when LNG is mixed with water is greater than anticipated. This underscores the present lack of a

full appreciation for how spill size may ultimately affect public safety. Additional LNG spill tests of 40 cubic metres, and larger scale (200-500 cubic metres) experimental tests planned in future years, will address these very important issues.

The program also includes the Department's conduct of radiological surveys to determine the nature and extent of contamination and the need for and potential magnitude of remedial action at sites and facilities used in past nuclear operations conducted for the Federal Government, including uranium processing sites and properties in their vicinity mandated for study under P.L. 95-604, the Uranium Mill Tailings Radiation Control Act of 1978. The program then independently evaluates and approves plans and reviews documents covering remedial actions prepared by the Assistant Secretary for Nuclear Energy. Upon completion of the remedial activities, the program provides for DOE an independent certification that final radiological conditions are in compliance with applicable standards.

Accomplishments for the Environmental Safety and Engineering program include:

- Environmental control data on land subsidence and water management associated with in-situ coal gasification was collected, evaluated and published.
- Programs to address environmental control and safety issues associated with synthetic fuel spills and complex energy facility operations were initiated.
- Enhanced environmental control options (e.g., for controlling effluents from coal wastes and trace hydrocarbon emissions from coal conversion facilities) were identified on the basis of laboratory data and economic evaluations.
- The final report integrating results from several laboratory and engineering synthetic fuel wastewater treatability studies was published. This report serves as a major resource for synfuel developers.

- o The need for additional focus on environmental control aspects of in-situ oil shale retorting was identified and a research program (with Fossil Energy participation) focusing on abandoned in-situ retorts was initiated.
- o Environmental control and safety data from experimental 40 cubic metre LNG spill tests were collected and evaluated.
- o Aerial radiological surveys at the nine highest priority inactive uranium mill tailings sites and comprehensive radiological surveys at several hundred private properties in the vicinity of the sites in Canonsburg, Pennsylvania, and Salt Lake City, Utah, were completed.
- o A report documenting the background and status of formerly utilized Manhattan Engineer District/Atomic Energy Commission sites was published and the survey and designation of the highest priority sites for remedial action was completed.

OPERATIONAL AND ENVIRONMENTAL SAFETY PROGRAM

OPERATIONAL AND ENVIRONMENTAL SAFETY - The Department of Energy owns and maintains one of the largest industrial research complexes in the nation, employing about 20,000 Federal and 130,000 contractor employees in facilities having a value in excess of $15 billion located at some 70 separate sites. This program develops environmental protection, safety, and health protection (ES&H) policies, and overviews their implementation by the Department's program and field offices. The objective of this program is to ensure that all Department-controlled activities are conducted in a manner that will meet applicable Federal, State and local regulations and standards; limit risks to the health and safety of the public and employees at acceptably low levels; provide protection to property and the environment. Since DOE's major Government-owned, contractor-operated facilities are exempt from regulation by the Nuclear Regulatory

Commission and by the Department of Labor relative to the Occupational Safety and Health Act, this program provides for this protection through its policy and overview efforts.

The Federal Emergency Management Agency has responsibility for coordinating the total Federal response to emergencies. However, a significant portion of the Federal Government's nuclear emergency response resources for radiological accidents are maintained in DOE under the overall management of this Operational and Environmental Safety program. Other Federal agencies, and State and local governments draw upon DOE's capability to detect and assess hazardous levels of radiation in the environment in an accident situation. This capability centers on fixed and rotary wing aircraft which carry state-of-the-art remote sensing equipment, complimented with photographic, multispectral, and computer analysis and assessment systems. Supplementing this is a computer-based accident management system to predict the transport, diffusion, and deposition of radioactive releases to the environment.

Accomplishments for this program include:

- o A program to evaluate and improve neutron dosimetric techniques for protection of DOE nuclear facility workers was initiated.
- o Guidelines to implement the safety analysis review system for DOE energy projects and programs were developed.
- o Development of "health-track" systems to monitor employee exposure to work place hazards is continuing.
- o Initiation of a hazardous waste management program to comply with EPA's recent guidelines on the Resource Conservation and Recovery Act.

Discussion of Changes from January Budget

The following specific changes are being made to the original budget.

- Grants to States for the implementation of a streamlined Federal, State and local permit review process (such as was done in Colorado) will be terminated.
- DOE funding for analyses of the environmental effects of applications of nonnuclear energy technologies, as well as water-for-energy assessments by the Water Resources Council, required by P.L. 93-577, The Federal Nonnuclear Energy Research and Development Act of 1974, will be eliminated. Legislation proposing deletion of these requirements will be submitted to Congress.
- The contractor support for developing an inventory of Federal Energy Related Environmental Research will be eliminated.
- Environmental outreach and planning support activities will be performed largely by in-house staff.
- Technical support for analysis of proposed environmental regulations that might affect energy plans and programs will be reduced. In-house staff will assume this responsibility.
- Unnecessary assessments of environmental problems of energy technologies, specific energy systems, and cross technology studies will be eliminated.
- The scope of the liquefied gaseous fuels environmental control and safety program will be largely directed to providing an understanding of the behavior of liquefied natural gas spill phenomena; supplemental components of this program, namely evaluation of spill prevention and control techniques, and consideration of fuels other than LNG and LPG will be delayed.

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- Independent evaluations of environmental controls for the DOE will be reduced in conjunction with the Departments redirected technology program activities.

Funding Summary	FY 1980 Appropri-ation	FY 1981 Appropri-ation	FY 1982 Jan. Budget	FY 1982 March Budget	FY 1982 Change
Program Direction	$ 9.8	$ 11.1	$ 10.7	$ 10.7	$ -
Full time permanent positions year end	232	220[a/]	220	190	-30
Other than full time permanent positions year end	11	11	11	11	-

The program direction budget provides the manpower resources to support program objectives in the Biological and Environmental Research and Life Sciences Research and Nuclear Medicine Applications program which have been transferred to the Office of Energy Research in the recently announced DOE reorganization, as well as the Overview and Assessment program in the Office of Environmental Protection, Safety, and Emergency Preparedness. This staff plans, organizes, directs, and controls programmatic initiatives relative to review and approval of technical proposals from an environment, health and safety (EH&S) standpoint. The staff is responsible for developing policy, issuing guidance, and monitoring and evaluating Departmental and contractor performance to assure Department-wide compliance with environmental and safety plans, regulations, and procedures to assure there are no undue risks to the safety and health of the public and employees. The allocation of these staff resources between the Office of Environmental Protection, Safety, and Emergency Preparedness and the Office of Energy Research is currently under consideration within the Department.

Discussion of Changes from January Budget to Revised budget

- Changes reflect the Administration's guidance on staffing levels compatible with reduced programmatic activities.

Mr. Chairman, this concludes my statement on the FY 1982 budget request.

[a/] Reduced from actual appropriation of 234.

Mr. SCHEUER. I would suggest, Mr. Fremling and Dr. Pewitt, that you might just want to talk with us informally for 8 to 10 minutes each, summarizing your testimony and alluding to anything that we may have said or anything that may have happened since the Secretary appeared before the full Science Committee, and then I'm sure we'll both have some questions.

STATEMENTS OF ALEX G. FREMLING, ACTING ASSISTANT SECRETARY FOR ENVIRONMENTAL PROTECTION, SAFETY, AND EMERGENCY PREPAREDNESS, DEPARTMENT OF ENERGY; AND N. DOUGLAS PEWITT, ACTING DIRECTOR, OFFICE OF ENERGY RESEARCH, DEPARTMENT OF ENERGY; ACCOMPANIED BY WILLIAM BURR, DEPUTY ASSISTANT SECRETARY FOR RESEARCH, DELMAR MAYHEW, DIRECTOR, FINANCIAL SERVICES DIVISION, AND CHARLES EDINGTON, ACTING DIRECTOR, OFFICE OF HEALTH AND ENVIRONMENTAL RESEARCH

Mr. FREMLING. Thank you very much, Mr. Chairman and Mr. Carney. We are pleased to be here this morning to discuss with you the Department's environmental program.

With us to assist in responding to your questions, on my left is Dr. William Burr, who is Deputy Assistant Secretary for Research, and on my immediate right is Mr. Delmar Mayhew, who is Director of the Financial Services Division; and on our far right is Dr. Charles Edington, who is Acting Director of the Office of Health and Environmental Research.

As you noted, we have provided a full statement for the record so I will be relatively brief in just summarizing some of the high points of that statement. I will be followed by Dr. Pewitt with a similar summary, and then we will be prepared to respond to your questions.

I would like to begin by giving you a little background on myself and my current role at the Department. In addition to my full-time position as Manager of the Richland Operations Office in the State of Washington, I was asked by Secretary Edwards on February 6 to serve as Acting Assistant Secretary for Environment until a permanent appointment is made by the President and confirmed by the Senate.

Subsequently, on February 25, as a part of a new departmental organization, to which you referred, this office has been renamed the Assistant Secretary for Environmental Protection, Safety, and Emergency Preparedness, and I am now serving in this position on an interim basis.

As you know, the Department of Energy Organization Act called for an entity within the Department of Energy for "advising the Secretary with respect to the conformance of the Department's activities to environmental protection laws and principles and to conduct a comprehensive program of research and development on the environmental effects of energy technologies." The health and environmental research programs conducted by the former Assistant Secretary for Environment, as you have noted, have recently been transferred to the Office of Energy Research.

The Department also has generic environmental responsibilities mandated by the National Environmental Policy Act, and is sub-

ject to environmental protection requirements established by other Federal, State, and local governmental legislation.

In response to these statutory requirements, the Office of the Assistant Secretary for Environmental Protection, Safety, and Emergency Preparedness is responsible for the conduct of the overview and assessments program.

The revised fiscal year 1982 budget estimate for overview and assessment, including program direction, is $60.3 million. Upon completion of staffing details presently under consideration, the program direction funds will be distributed between the Office of Energy Research and the Assistant Secretary for Environmental Protection, Safety, and Emergency Preparedness.

In conducting this program, our emphasis is on assuring that programs are accomplished and the technologies are being readied by the Department for use in accordance with environment, safety and health requirements.

With this as background, I will now address the major program areas within the overview and assessment program.

This program insures that the Department will adequately meet all environmental, health and safety requirements. The specific functions consist of overview, assessment and appraisal of plans, programs, facilities, and field operations to assure compliance; the issuance of internal policies and requirements; the development of compliance guides and technical information for incorporation into Department planning and decisionmaking; and the support of other programs in carrying out their compliance responsibilities in these areas.

The environmental assessments program comprehensively applies research findings to evaluate how current and proposed environmental issues, laws and regulations might affect energy development and use. These assessments also evaluate how energy plans and programs might affect environmental health and safety.

In environmental safety and engineering, as a part of the overview and assessment program, work is conducted to collect new and confirmatory environmental control data which can be used to evaluate existing and anticipated environmental control laws and regulations. This activity also includes conduct of radiological surveys to determine the extent of contamination and the need for remedial action at sites and facilities used in past nuclear operations.

The operational environment, safety and health activities insure that all Department-controlled activities are accomplished in a manner which will meet applicable regulations and standards; limit the risks to the health and safety of the public and employees to acceptably low levels; and to provide protection to property and the environment.

Mr. Chairman, this concludes my opening remarks. At this point Dr. Pewitt will discuss the health and environmental research programs, and then we'll be pleased to respond to any questions you might have.

Mr. SCHEUER. Please proceed, Dr. Pewitt. Your statement, as I said before, will be printed in full at this point in the record.

[The prepared statements of Dr. Pewitt and Dr. Edington follow:]

STATEMENT OF N. DOUGLAS PEWITT
ACTING DIRECTOR
OFFICE OF ENERGY RESEARCH
DEPARTMENT OF ENERGY

HOUSE SCIENCE AND TECHNOLOGY COMMITTEE
SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURE RESEARCH AND ENVIRONMENT

MARCH 13, 1981

Mr. Chairman, it is an honor to appear before you today to discuss the Department's programs on Biological and Environmental Research and Life Sciences Research and Nuclear Medicine Applications. As you know, the Department has recently reorganized its activities. This program, which was formerly the responsibility of the Assistant Secretary for Environment, is now the responsibility of the Office of Energy Research. This move combines in one organization the Department's major programs that involve fundamental scientific investigations since we are also responsible for Basic Energy Sciences, High Energy and Nuclear Physics and Magnetic Fusion Energy. In my testimony today, I will focus on the overall strategy of the environmental, health and safety research areas transferred to the Office of Energy Research.

With me is Dr. Charles Edington, Acting Director of the Office of Health and Environmental Research, who will submit a more detailed statement for the record and will be available to respond to questions.

The Biological and Environmental Research program is aimed at identifying and characterizing the effects of the major environmental, health, and safety concerns that could constrain the development and use of promising technology options being pursued by the Department. This program also provides research support for other programs of the Department such as environmental and health effects analyses of potential radiation hazards associated with the Department's defense activities, and protection of workers and the general public in various large-scale energy research related field operations.

The mission of the Biological and Environmental Research program is to define the major biologically hazardous pollutants associated with each energy technology option, determine their effects, and develop a better understanding of how those pollutants move through and behave in the environment. Generic research efforts conducted in this program address issues and concerns common to several technologies. These research efforts include such activities as chemical analysis and measurement of pollutants, research on ecosystems, and evaluation of comparative metabolism rates. Where specific products, compounds or mixtures are to be investigated, dose-response relationships are studied in various experimental systems. These relationships are quantified and the magnitude and type of biological response is described. Investigations of the mechanisms underlying the biological response or damage are conducted to facilitate the development of risk estimates for workers, the public and the environment.

This approach requires diversified, coordinated multidisciplinary research in several areas. These include pollutant characterization, measurement, and monitoring; studies related to processes which can produce cancer or inheritable defects; and studies on toxicology, or damage, to functional systems. Multidisciplinary research also includes the study of epidemiology, clinical studies, and quantitative risk analysis; as well as ecological, terrestrial, aquatic, and atmospheric studies. Climate-related research is also carried out.

In addition to the Biological and Environmental Research program I have just briefly discussed, the Office of Energy Research is also responsible for the Life Sciences Research and Nuclear Medicine Applications program. This program has two focuses. The first is the development

of fundamental information on the normal structure and functions of living organisms. This information on how organisms should function provides a conceptual basis for understanding and predicting the health and environmental effects of energy-related pollutants. This information, generated through research in genetics, cellular and molecular biology and biophysics, supports the Biological and Environmental Research activities that are directly related to technology problems. The second focus of the program is to develop and test new and improved uses for radiation, isotopes and instrumentation in the diagnosis and treatment of human diseases.

The interactions between energy and the environment are very complex. We must recognize that every energy system has some effect on the environment and that every energy system carries with it potential threats to human health. Everything we do in this world can have some consequence for environment and health. The issue is not whether these consequences are important--the issue is to understand what is truly harmful and what is not. Unfortunately, nature seldom presents us with such black and white choices. The impacts of pollutants are subtle. The processes by which contaminants are transported and transformed are still not well understood; and the direct and indirect effects, whether on man or on ecological systems, are not precisely known. Although it is inevitable that we shall have to make some of our choices of energy systems using incomplete information, we must do so based on the best information that can be made available. The purpose of biological and environmental research is to extend and broaden that information base so that choices can be made more wisely.

I consider biological and environmental research to be very important in addressing the missions of the Department of Energy. As we all know, environmental issues affect the successful development of every type of energy resource. As we proceed with research and development programs to enhance the Nation's energy supply and improve the efficiency of energy use, we must never forget the need both to protect the safety of our citizens and to preserve the integrity of the natural environment. To meet this goal requires a deep understanding of health and environmental effects and this program of scientific research is devoted to the objective of contributing to that understanding.

Mr. Chairman, this program is broad and diverse. It ranges from the most fundamental aspects of molecular genetics to pollutant monitoring, marine biology and the long-term effects of CO_2 in the atmosphere. It relies upon the skills of broad categories of scientific specialists from pathologists and health physicists to chemists and climatologists.

At this stage, I cannot claim to understand this program fully. However, I have underway a thorough review and assessment to determine the most effective direction in which to proceed. Let me identify some of the issues that I intend to address.

First, the overall program design is, in my view, in need of reexamination. As you will see, we have ongoing research on every energy source. The work currently addresses not only national, but also regional and local issues. I want to be sure that we are addressing the most important questions, both in terms of short-term problems and long-term issues. I want to be sure that the balance among problem areas is reasonable and that the research is designed to produce the answers that will be needed to make critical decisions in a timely manner.

Second, we must recognize that the Department is by no means the only Federal agency supporting health and environmental research. The National Institutes of Health, and particularly the National Institute of Environmental Health Sciences, have major programs that relate to our concern for human health. The Environmental Protection Agency has a broad mandate and a vigorous program of energy-related research, while basic research both in biology and environmental sciences receives considerable support from the National Science Foundation. I have been assured that our programs are well and fully coordinated with these other responsible Federal agencies. Nevertheless the roles and responsibilities of the various Federal agencies need to be clearly defined and articulated. Moreover, there are major responsibilities for undertaking environmental and health impacts that must be met by the private sector. I strongly support the view that the Federal Government should not intrude in those areas that are properly private sector responsibilities.

Third, I want to be sure that this important program has the necessary resources to tackle on a timely basis the important issues that could inhibit introduction of energy support systems. This Administration's program request for FY 1982 is $221 million. Of this amount, $170.5 million is for the Biological and Environmental Research program and $50.5 million is for the Life Sciences Research and Nuclear Medicine Applications program. This request is somewhat lower than the level proposed by the previous Administration. This level reflects a need to ensure that only the highest quality and most important work will be done. With anticipated inflation, the proposed budget for the Biological and Environmental Research Program corresponds to about a 10 percent

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decrease in the level of effort; and the Life Sciences Research and Nuclear Medicine Applications program will be maintained at the current level of effort. The reduction in the BEP budget is compatible with the need for a healthy review of the program and renewed attention to priorities. In our review and assessment of this program, we are, of course, addressing the resources needed to execute the program in future years. Levels proposed for FY 1982 will permit a responsible continuation of the highest quality research while undertaking that assessment.

Mr. Chairman, I have tried to present a realistic picture. The questions being attacked by this program are tough questions. Some may require very long baseline research and some may simply be beyond the present capacity of scientific inquiry. My concerns are not with the quality of the present scientific programs. Reviews of the scientific substance have given this program high marks and its quality has been said to be fully comparable to that in NIH and NSF. My concern is with the targeting of the research and the overall strategy that it reflects.

The proposed FY 1982 budget builds upon many significant scientific achievements and describes the relevance of these achievements to various energy systems. In my view this is a sound scientific program with a well established track record and it fully deserves your support.

Mr. Chairman, that concludes my testimony. I will be pleased to respond to any questions the Subcommittee might have.

STATEMENT OF DR. CHARLES W. EDINGTON

ACTING DIRECTOR, OFFICE OF HEALTH AND ENVIRONMENTAL RESEARCH

OFFICE OF ENERGY RESEARCH

DEPARTMENT OF ENERGY

BEFORE THE

SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURE RESEARCH,

AND ENVIRONMENT

OF THE

COMMITTEE ON SCIENCE AND TECHNOLOGY

HOUSE OF REPRESENTATIVES

MARCH 13, 1981

INTRODUCTION

Mr. Chairman, Members of the Subcommittee, my name is Charles W. Edington. I am pleased to be here today as Acting Director, Office of Health and Environmental Research, Office of Energy Research to present to you the Department of Energy's budget request for FY 1982 for the Biological and Environmental Research and Life Sciences Research and Nuclear Medicine Applications programs. These programs, which provide for the Department a comprehensive and effective program of health and environmental research, were recently transferred to the auspices of the Office of Energy Research. These programs are designed to meet the specific environmental responsibilities and functions assigned to the Department by the DOE Organization Act (Public Law 95-91), namely to conduct a comprehensive program of research and development on the environmental effects of energy technologies.

The activities of these programs are divided into two principal categories: (1) Biological and Environmental Research activities that develop health and environmental effects information on energy-related pollutants so that potential environmental consequences of a promising energy technology can be addressed early in the development phase, and (2) Life Sciences Research and Nuclear Medicine Applications activities. This research category is further subdivided into two independent but very important research efforts, They are (a) General Life Sciences which provides more fundamental information on normal biological and ecological systems so that damage by energy-related chemical and physical agents (including radionuclides) can be better understood, and (b) Nuclear Medicine Applications which focuses on the development of new and improved methods for using radiation, radionuclides, and stable isotopes for use in the diagnosis and treatment of human diseases.

The revised FY 1982 total Budget Authority estimate for the Biological and Environmental Research and Life Sciences Research and Nuclear Medicine Applications programs is $221.0 million. This compares to the estimate of $258.0 million contained in the January FY 1982 budget submitted to the Congress for these programs.

Funding Summary	FY 1981 Appropriation	FY 1982 Budget Authority January Budget	March Budget	Change
Biological and Environmental Research[a/]	$172.2	$204.2	$170.5	$-33.7

The Biological and Environmental Research program is aimed at identifying, characterizing, and determining the effects of the major environmental, health, and safety concerns that could constrain the planned development and use of promising fossil, nuclear, conservation and renewable technology options being pursued by the Department. Also, this program provides research support for other programs of the Department such as environmental and health effects analyses of potential radiation hazards associated with DOE's defense activities and protection of workers and the general public in various large scale field operations.

The mission of this program is to define the major biologically hazardous pollutants associated with each energy technology option and characterize their transport, fate and behavior in the environment. Generic research efforts (such as chemical analysis and measurement of pollutants, research on ecosystems, or evaluation of comparative metabolism rates) conducted in this program address issues and concerns common to a multitude of technologies. For specific products, compounds or mixtures, dose-response relationships in various experimental systems are quantified and the magnitude and type of biological response described. Investigations of the mechanisms underlying the biological response or damage are conducted to provide a scientific data base which will facilitate the development of risk estimates for workers, the public and the environment.

[a/] See Attachment A for additional details.

This approach requires diversified, coordinated multidisciplinary research in the areas of pollutant characterization, measurement, and monitoring; carcinogenesis, mutagenesis, and toxicology; epidemiology, clinical studies, and quantitative risk analysis; ecological, terrestrial, aquatic, and atmospheric studies; and climate-related research.

FOSSIL RELATED RESEARCH

Fossil energy related research underway includes:

- Characterization of the environmental health and safety (EH&S) effects associated with the increased production and use of fuels from domestic coal and shale, utilizing materials from representative coal liquefaction, gasification and shale oil processes under development. Emphasis is on defining the delayed effects of unregulated hazardous pollutants common to these various processes that are likely to involve human or environmental exposure.
- Determination of the effects of pollutants in effluents and wastes released from advanced fossil energy systems as well as combustion products of coal and shale derived liquids as compared to natural petroleum.
- Evaluation of the mechanism of formation, transport and ecological impacts of acid rain.
- Research on the increase of atmospheric carbon dioxide from energy sources and on the global environmental and societal effects of this increase. In addition to its research program, the Department of Energy is the lead Federal agency for the National Program on Carbon Dioxide, Environment and Society, a role which has been assigned to the Biological and Environmental Research Program by the National Climate Office, established by P.L. 95-367, The National Climate Program Act. The Program also plays a major role in U.S. initiatives in international carbon dioxide activities.

- o Generic research on the metabolism and mechanisms of damage for possible human carcinogens and mutagens associated with advanced energy processes.

NUCLEAR RELATED RESEARCH

Nuclear activities support long term research on the EH&S issues associated with the nuclear fuel cycle improvements and weapons material production and testing. Emphasis is on quantifying the carcinogenic and mutagenic risks of chronic low-level exposures to external radiation sources and internally deposited radionuclides on selected human and animal populations. Research is also continuing on the atmospheric, terrestrial and aquatic transport and behavior of transuranics and long-lived fission products from their source to man.

RESEARCH RELATED TO CONSERVATION AND RENEWABLES

Research in support of developing renewable energy resources and conservation measures emphasize:

- o Chemical and biological characterization of emissions from the use of alternative automotive fuels (diesel, alcohol blends), refuse-derived fuels and radon buildup following building weatherization.
- o Biological effects of tritium and strong magnetic fields associated with fusion development.
- o Ecological effects of biomass production, pollutant characterization and toxicity studies of photovoltaic materials.
- o Environmental effects associated with geothermal energy resources.

MULTITECHNOLOGY RELATED RESEARCH

Multitechnology research addresses important requirements broadly relevant to more than one technology. These efforts include the development and evaluation of models for describing pollutant transport, distribution and fate in the environment; improved instrumentation, methods and concepts for monitoring and characterizing chemical and

physical agents and their interactions with biological systems; and baseline ecosystem data to help recognize, quantify, and rectify the extent of environmental disturbance from the various stages of a given energy cycle.

A risk analysis program determines the generic health and environmental risks of specific energy technology options being developed by DOE. Risk estimates for coal liquefaction, gasification, oil shale, fluidized bed combustion, photovoltaic systems, electric storage batteries, diesel powered vehicles, geothermal energy, combustion of municipal wastes and the National Energy Plan are underway.

BIOLOGICAL AND ENVIRONMENTAL RESEARCH PROGRAM ACCOMPLISHMENTS

Accomplishments for this program include:

- The greatest mutagenicity and carcinogenicity in the high boiling point products from all three direct liquefaction processes was determined to be due to aromatic amines. Subsequent upgrading by catalytic hydrogenation reduced the biological activity by 90 percent.
- It was determined that process streams from a high BTU gasification pilot plant contain insignificant mutagenic activity suggesting that these processes are inherently less hazarous than coal liquefaction.
- The occupational health study on Paraho oil shale workers was published. It was found that no chronic or acute disease is attributable to oil shale development.
- It was determined that fine particulate emissions from fluidized bed combustion are no more toxic than similar emissions from conventional combustion.
- Fish toxicity resulting from acid rain in the northeastern U.S. lakes has been found to be due, at least in part, to high levels of aluminum leached from soil due to acidic precipitation. Thus, amelioration of fish kills requires control of the aluminum.

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- o Continuing investigations of the atomic bomb survivors now shows that in addition to leukemia, lung, thyroid and breast cancer, there is a significant association between multiple myeloma and large bowel cancer and radiation exposure.
- o A major reference book, Transuranic Elements in the Environment, was published synthesizing six years of research. One major finding is that present environmental levels of transuranic elements have not produced observable ecological effects.
- o Preliminary findings suggest that radon buildup in buildings with reduced ventilation rates may constitute a significant health risk.
- o Four health and environmental effects documents were published which provided preliminary risk analyses for: near-term electric storage batteries (lead/acid, nickel/zinc, nickel/iron) as related to electric hybrid vehicle applications; photovoltaics, diesels and the National Energy Plan.
- o A hand-held monitor was developed for detecting organic contamination of surfaces. Units are now under fabrication for use in fossil energy pilot and demonstration plants.

Discussion of Changes from January Budget to Revised Budget

In consonance with the revised budget, research in the Biological and Environmental Research program will continue to address the highest priority health and environmental issues associated with both nuclear and nonnuclear technologies and conservation options. Reductions were made in lower priority areas and in near term site specific activities which are properly a private sector responsibility.

Specifically, the following changes from the original budget request are being made in order to be consistent with revised DOE technology program emphasis.

- o Reduction in research on health and environmental problems associated with use of fossil energy resources.
- o Reduced funding for research on health and environmental effects of solar and conservation options.

- o Research on generic problems associated with transport, chemical conversion, behavior and fate of energy-related pollutants through the air, aquatic and terrestrial environments will be reduced.
- o Funding for capital equipment and construction items (modification of current research facilities) will be reduced.
- o Funds are provided to accommodate a cost of living increase in order to maintain current level of health and environmental research on nuclear activities, especially research on the long-term effects of low-level ionizing radiation.

Funding Summary	FY 1981 Appropriation	FY 1982 Budget Authority January Budget	March Budget	Change
Life Sciences Research and Nuclear Medicine Applications[a/]	$ 45.9	$ 53.8	$ 50.5	$- 3.3

The objectives of this Life Sciences Research and Nuclear Medicine Applications program are to develop fundamental information on the normal structure and function of living organisms to provide a conceptual basis for understanding and predicting the health and environmental effects of energy-related pollutants and to develop and test new and improved uses for radiation, radioactive isotopes and instrumentation for better diagnosis and treatment of human diseases.

GENERAL LIFE SCIENCES PROGRAM

The General Life Sciences program supports long term basic biological research in genetics, cellular and molecular biology and biophysics in order to:

- o Understand the relationship between the structure of genetic material (DNA), proteins, cell membranes, and other subcellular particles and their biological function.
- o Determine how changes produced in these important biological materials result in hereditary effects, cancer and other human diseases.

[a/] See Attachment B for additional detail.

- Identify how damage of altered genetic material and proliferating cellular systems, required for normal function of the living organism, are repaired and recover from a change in their structure or function.
- Characterize the physical and chemical processes involved in the interaction of energy-related pollutants with biological systems.
- Develop new and advanced biological test systems and instrumentation for rapid and inexpensive measurement of biological damage and characterization of energy-related pollutants.

NUCLEAR MEDICINE APPLICATIONS PROGRAM

The Nuclear Medicine Applications program supports research to:

- Develop more effective techniques for the production of radionuclides with desirable properties for diagnosis and treatment of human disease;
- Develop radiopharmaceuticals and compounds labeled with stable isotopes for studies of physiological processes, improved methods of diagnosis and reduced patient radiation dose in nuclear medicine procedures;
- Assess the feasibility for radiation therapy using beams of heavy charged particles; and
- Develop advanced instrumentation for noninvasive (nonsurgical) measurements of physiologic changes that occur with human diseases, from the aging process, or as a result of environmental insults.

LIFE SCIENCES RESEARCH AND NUCLEAR MEDICINE APPLICATIONS ACCOMPLISHMENTS

Accomplishments for this program include:

- A flow chamber has been constructed for analysis of mammalian sperm cells which permits rapid and accurate measurements of the DNA content for individual sperm cells and the detection of the presence of abnormal sperm cells. This test could be applied to workers exposed to energy-related pollutants.
- A chemical substance is induced in animals after exposure to cadmium and zinc which serves to protect cells from damage by these toxic metals. Research under way is directed toward isolating the responsible gene, understanding how it is organized, and determining the conditions under which it is either activated or repressed.
- Research is also underway to permit us to understand how pollutant molecules can distort the transmission of genetic information and cause heritable changes as well as cancer.
- A mammalian cell system that measures genetic damage and cell death rates within 2 days of exposure to hazardous agents has been developed. This procedure, after proper validation, would be an important addition to support the widely used bacterial assay systems which are physiologically different from mammalian cells.
- A special high resolution nuclear magnetic resonance (NMR) spectrometer has been developed that has the capability of analyzing the structure of biological molecules directly within the cells and organs. Studies have been initiated to determine the structure of key nucleic acids and proteins.

- o The development of portable systems for production of krypton-81m and manganese-52m was completed, and their clinical utility for a variety of pulmonary ventilation and cardiac imaging studies was demonstrated. Because of the higher specific radioactivity of the short half-life of krypton-81m, it is now possible to obtain sequential images of the heart during the cardiac cycle. The shorter half-life of manganese-52m (0.3 hours) as compared to routinely used thallium-201 (73 hours) will result in much lower radiation dosages to the patient.
- o Development and preclinical testing of a portable blood irradiator using the beta emitting radionuclide, thulium-170, is expected to be successfully completed shortly and will be used in patients who require suppression of the immune reaction during the early phase of organ transplantation.
- o A newly developed fluorescence bronchoscope is being used to detect early lung cancer in the uranium miner population via a joint program with the National Cancer Institute.
- o Investigation of leukemia, adenocarcinoma, pituitary tumor, melanoma, and carcinoma in animals show a rapid and high uptake of fluorine-18-labeled fluordeoxglucose in the tumors, which make it possible to image previously difficult to detect human malignancies.

Discussion of Changes from January Budget to Revised Budget

- o Maintain level of effort for research on basic biological principles which underlie the response of normal systems to pollutant damage.
- o Reduction of capital equipment consistent with current program.

Mr. Chairman, this concludes my statement on the FY 1982 budget request.

Attachment A

Department of Energy
FY 1982 Budget to Congress
Biological and Environmental Research
(Budget Authority in Millions)

Funding Summary	FY 1981 Appropriation	FY 1982 Budget Authority January Budget	FY 1982 Budget Authority March Budget	Change
Human Health Research	$ 27.5	$ 32.1	$ 31.4	$- 0.7
Health Effects Research in Biological Systems	46.6	58.8	46.5	-12.3
Environmental Research	32.4	36.9	29.8	- 7.1
Physical and Technological Research	30.7	35.1	28.4	- 6.7
Carbon Dioxide and Climate Research	12.9	18.5	16.7	- 1.8
Health and Environmental Risk Analysis	4.0	4.9	4.0	- 0.8
Subtotal - Operating Expenses	$154.1	$186.3	$156.8	$-29.5
Capital Equipment	11.7	12.7	9.7	- 3.0
Construction	6.4	5.2	4.0	- 1.2
Total - Biological and Environmental Research	$172.2	$204.2	$170.5	$-33.7

Attachment B

Department of Energy
FY 1982 Budget to Congress
Life Sciences Research and Nuclear Medicine Applications
(Budget Authority in Millions)

Funding Summary	FY 1981 Appropriation	FY 1982 Budget Authority January Budget	FY 1982 Budget Authority March Budget	Change
General Life Sciences	$ 24.0	$ 28.9	$ 26.6	$- 2.3
Nuclear Medicine Applications	20.0	21.7	21.7	-
Subtotal - Operating Expenses	$ 44.0	$ 50.6	$ 48.3	$- 2.3
- Capital Equipment	1.9	3.2	2.2	- 1.0
Total - Life Sciences Research and Nuclear Medicine Applications	$ 45.9	$ 53.8	$ 50.5	$- 3.3

Dr. PEWITT. Mr. Chairman, it's an honor to be here with you today to discuss the biological and environmental research program of the Department.

As you know, the Department has recently been reorganized and these responsibilities are new to the Office of Energy Research. I'm not going to take time reading and trying to tell members of this committee what this program consists of. I strongly suspect that you probably know better than I do at this point in time what is in this program. However, what we have done is put the biological and environmental research program into an organization that is dedicated to conducting objective scientific research.

There are some practicalities of management within an agency. The Director, when we get a Director—until that point, I am Acting—we will be able to concentrate on quality scientific research. I do not have many of the concerns that Mr. Fremling has with the overview and assessment program. We view this as a positive change for the research program.

I just want to say a few things about my perspective on the interactions of the environment and energy. First of all, these are very complex interactions. My training is as a high energy physicist, which is pretty esoteric, but I look at the complexities of the scientific problems being attacked in this environmental area, and it's mind-boggling. We are asking some of the toughest questions we have ever asked of nature in trying to understand what the impacts of energy production are, what are the mechanisms of transport, and conversion of the effluents, et cetera, and what those effects might be on human beings. We are asking the scientific community to answer questions that do not have quantitative answers. They're much like questions of social acceptability.

Mr. SCHEUER. Can you explain—Go ahead.

Dr. PEWITT. The problem is there aren't black and white answers. Science can only quantify within some level of precision what these questions are. Society wants black and white answers. It's beyond the ability of scientists to give you black and white answers to social problems. We can provide facts.

Mr. SCHEUER. Well, these aren't social problems, Dr. Pewitt. These are science problems. I understand the complexity of these problems.

Dr. PEWITT. Yes.

Mr. SCHEUER. My main concern—and all of you are dedicated, concerned, and deeply committed individuals, is that at a time when we have an explosion of interest in producing new alternative sources of energy, we are cutting significantly the budget to study the environmental problems and health fallout, that we can expect from these new sources of energy. We are reducing the scientific and technological capability of your office in devising strategies to help us move forward into this new crash program of producing alternative sources of energy that at least maximize the present state-of-the-art of environmental research, and makes the pollutants as benign as possible.

It seems to me there's a basic conflict here. I fail to understand how, at this time, with all of the problems that you mention—and I agree with you, that it's agonizingly complicated—that they do not justify a significant cut in your R. & D. budget.

Dr. PEWITT. I understand what you're saying, sir.

As I said before, I can't possibly say that I understand this program yet. The last time I tried to walk on water after a week's training, I got my socks wet. However, what I am trying to do at this point is to understand some of the basic problems facing this program, and I am addressing the problems as I can.

First of all, let me say that I think perhaps some of the problems have been in articulating the program's goals, so the program is clearly understood by people who are not intimately familiar with it. As I absorb this research program, my highest priority, will be to undertake a very serious examination to learn how one accurately articulates the thrust of this program. My personal view is it has not been done well in the past within the Department and the administration.

Mr. SCHEUER. Perhaps when we have further testimony several weeks from now we'll invite you to come back to give us the results of this introspective process you're about to undertake.

Dr. PEWITT. I want to assure you that I want to insure that we are addressing the most important problems in this area, both in terms of short-term results and long-term issues, to make sure we have achieved the correct balance within our research program.

Another problem that I need to understand and learn how to articulate, is how the Department's research program in this area relates to other programs within the Federal Government, how it relates to the programs of the National Institutes of Health, the Environmental Protection Agency, and the National Science Foundation. All of these programs conduct the type of research that would sound similar if you make a two-line description. I have spent a fairly large number of hours over the last week trying to understand this. I am convinced that we're not duplicating, that we have significantly different work underway with a different focus than these other agencies have. One needs to learn how to make it clear that the Federal efforts are not duplicative and redundant.

Finally, I want to make sure, after I have done this, that I can define the resources required for conducting this program. I can't tell you what that number is right now. Over the next several months we will be investigating this area very carefully and then will make our proposal. The gentlemen in the Office of Energy Research will tell you that when I make up my mind on what's right, I'm a tiger protecting my cubs. One needs time to come to a position that one can believe strongly in. One does not shoot from the hip.

But we will be addressing that problem over the summer. I do not have the immediate answer and I cannot, I would not deceive you with a guess.

Mr. SCHEUER. Well, I respect the rather scholarly and professional way that you're approaching this enormously complicated subject, and I respect your stated need for more time to put your program in order.

I would hope that within the next few weeks we could get you back, after you've had a chance to add more hours to the hours you have already spent.

I respect very much your very thoughtful, diligent, and professional approach.

Dr. PEWITT. I would have to say I am sitting in this chair, and you're discussing the subject with me today, because I am an Administration witness. I am under certain constraints as an administration witness and I will respect those constraints, sir. There is a process through which we arrived at the budget, and I will defend the budget of the President to the last dime, not a dime more and not a dime less, as long as I sit in this chair. I cannot do otherwise and be true to an oath that I took. That is the role of someone who is confirmed by the Senate in this office, not someone who is an acting director. I must be honest with you about that.

Mr. SCHEUER. I would always expect you to be honest, and I don't want to get into any controversy with you——

Dr. PEWITT. I understand.

Mr. SCHEUER. Off the record.

[Discussion off the record.]

Mr. SCHEUER. Is there any further direct testimony that any of you would like to offer?

Mr. FREMLING. No. We are prepared to answer your questions.

Mr. SCHEUER. All right. Congressman Carney.

Mr. CARNEY. Thank you, Mr. Chairman.

Mr. Fremling, maybe I could address this question to you.

In the prepared statements, there were repeated references in the testimony to the January budget request, which is 19 percent higher than the budget appropriation for fiscal year 1981. But since the January request was never subjected by this committee to detailed evaluation, the relevant base is actually the 1981 appropriation. The DOE 1982 request of $281,300,000 is only one-tenth of a percent less than what it was last year.

My first question is, what percentage of this 1982 request is for nuclear activities, and what percentage is for nonnuclear activities? I don't care who answers the question. I'm alluding the statement to you, and I don't care who answers the question.

Mr. FREMLING. We may have to do a cut on that and we can give you the answer for the record. But I can't right off the top of my head.

Mr. CARNEY. OK, fine. I can appreciate that.

I was wondering, too, if you could give us the numbers both for this year and for last year, so we can make some kind of comparative analysis.

[Material referred to follows:]

FY 1981 AND FY 1982 BUDGET
PERCENTAGES BY ENERGY TECHNOLOGY
(for Overview and Assessment, Biological
and Environmental Research, Life Sciences
Research and Nuclear Medicine Applications,
and Program Direction)

	FY 1981 Appropriation	FY 1982 Request
Nuclear	24.1%	27.8%
Nonnuclear	31.8%	29.9%
Multi-Technology*	28.5%	25.1%
General Science	15.6%	17.2%
	100.0%	100.0%
	($281.7m)	($281.3m)

*Includes plant, capital equipment, and program direction.

Mr. CARNEY. Last year DOE was intimately involved in five demonstration plants for conversion of coal to environmentally acceptable fuels. This year, the Fossil Energy Office is getting out of the business at the direction of the administration.

That being the case, why the large continuing environmental activity?

Mr. FREMLING. In the case of the technologies which are going to receive decreasing emphasis under this administration, clearly those environmental problems, including some environmental research, will have to be done in conjunction with those technologies when they're picked up, hopefully, by private industry and will have to be done by private industry. But there are impacts which will go beyond what industry will have to do to meet the regulatory requirements that will be placed upon them, that may have interaction with other pollutants from other kinds of facilities which may go way beyond plant boundaries and so on. Those kinds of activities will continue to be the responsibility of the Department of Energy in its overview of the impact of energy technologies on the environment at large.

Mr. CARNEY. Do you expect private industry or private enterprise will pick up at the same rate that we have pursued those conversions?

Mr. FREMLING. That, I think, is going to be a function of how rapidly private industry does or does not pick up the technology which is now, in effect, being turned over to them.

Mr. CARNEY. Do you feel that if they continue at the pace we would have accomplished if we hadn't dropped those programs, you will be in a position to answer the questions pertaining to the environmental aspects of those programs?

Mr. FREMLING. I think at this point I ought to defer to Dr. Edington or Doug Pewitt. I'm getting into the energy research area rather than that for which I'm responsible.

Mr. CARNEY. I'll ask it of the panel.

Dr. PEWITT. Let me try answering—and Charlie has got numbers; he knows the details of the program.

I'm going to be very candid with you. There is still some ambiguity concerning what the Department supports with regard to private efforts and the Department's own development program. This should not be surprising.

We have made significant changes in the direction of the Department's program. We have to do a real review and come up with a policy framework. Presently, I don't have a policy framework from which I am operating. I'm aware of the problem and we have to resolve it.

With regard to private activities that we're not directly involved with, and how involved we get into that research, that is a question that is not resolved.

Perhaps Charlie has a better answer for you.

Mr. SCHEUER. Before Dr. Edington speaks to us—and I appreciate your candor in telling us that you don't have a policy framework—it seems to me a policy framework is an indispensible precondition for moving ahead on these massive programs.

When do you think you could come down and testify and advise us what your policy framework is?

Dr. PEWITT. Mr. Chairman, in order to understand what the questions are I must first understand the program. I have gotten to the point now where I know what sort of questions I think ought to be answered. To be perfectly honest, it was about 7 or 8 o'clock on Wednesday night that it finally sunk into my head, exactly what the questions were that I had to get some answers to.

Mr. SCHEUER. If the gentleman will continue to yield, very briefly, I'll give him as much time as he needs thereafter, we could continue making these disingenuous—we'll go off the record.

[Discussion off the record.]

Mr. SCHEUER. Going back on the record, I would like to know when you would be able to come down and testify before us as to what your policy framework is within which we're moving to these crash programs for new energy sources.

Dr. PEWITT. I understand the question. I will move as rapidly as possible to get a policy articulated and a policy decision. I don't know whether that will be 2 weeks, 3 weeks, or 4 weeks. But I certainly would consider it intolerable for me to have to continue to operate for a period much longer than that without having some direction, sir.

Mr. SCHEUER. Why don't we just assume that in about 3 or 4 weeks we hope to have you back here. I'm not holding you to a specific time. We're not trying to be unreasonable.

Dr. PEWITT. I understand.

Mr. SCHEUER. But clearly, if you can sit there and say there is no policy framework within which to function—you know, nature abhors a vacuum and we ought to fill that vacuum.

Dr. PEWITT. There is a policy framework, but the ramification of that for the specific programs that I am dealing with just is not altogether clear.

Mr. SCHEUER. I respect that, and you certainly should have adequate time to bite the bullet and come to some of those hard judgments.

Why don't we get in touch with you informally in a couple of weeks, and tell us when you're prepared to come back.

Dr. PEWITT. I do not mean to be disingenuous. I mean to be responsive and honest with you.

Mr. SCHEUER. I am sure you are. I respect the very professional approach you are making, and I respect your candor in telling us that you have not formulated, nor has anyone formulated for you, a policy framework within which to function. All we want to do is learn about it when you have reached that point.

Why don't we just leave it that we'll be in touch with you in the next 2 or 3 weeks and you will come back when you're capable of giving us your further thoughts on this matter.

I thank you for yielding, Mr. Carney. Please continue for as long as you wish.

Mr. CARNEY. Thank you, Mr. Chairman.

I can fully appreciate the problem that the panel has under these circumstances, and I think in a timely fashion they will be prepared to come back and address these concerns that we have.

But I think Mr. Fremling hit out on something—at least he answered to some degree my question, and it satisfied me. And that was that you have to be prepared to have an evaluation of the

environmental consequences that would be brought about by anyone pursuing this type of conversion program to fossil fuels, whether it be the Government or private industry. I appreciate that.

My question perhaps is not one of policy, but it's one of asking you gentlemen here—and I know we're getting away from environmental areas and moving to another area—of trying to ballpark whether you believe in your shop that the industrial private enterprise sector will pick up and maintain these programs and you will, one, keep up with them so we can react to the programs as they are picked up, or two, will you be ahead of them. That's the only question I'm trying to ask.

Mr. FREMLING. I'll try to be as responsive as I can.

I think that industry to a large degree will be required by the various permitting processes to take care of the perhaps gross environmental insults that might occur through the operation of a specific plant or plants if they didn't have environmental control technologies and so on. I think that clearly will happen.

There are phenomenas, as I mentioned before, though, that go beyond the operation of a specific plant or series of plants—for example, the CO_2 issue. It is certainly our intent as an agency to stay on top of that problem, because that has much more far-reaching consequences as to whether or not there can be significant increases in the use of fossil, not only nationwide, but worldwide. That has not only national but, obviously, international implications. There is a very heavy involvement in that program right now, and there will continue to be.

Acid rain is another area which would go beyond the permitting process. There may be effects which are not impacted by regulation, but they might end up being cumulative effects, nonetheless. It's in those cumulative effects that we will continue to have a role.

Mr. CARNEY. I appreciate that very much.

I guess I could summarize by saying on budget issues you're prepared; on policy issues you're suffering from "I don't know" squared, and you don't know what you don't know. I can understand that.

Mr. FREMLING. I think part of the problem is that your question was related to whether we can predict whether industry is, one, going to pick up this technology, which is near term and closer to commercialization, which the Government is now leaving——

Mr. CARNEY. Right.

Mr. FREMLING [continuing]. And two, whether they will do the research and development work that they probably ought to be doing in conjunction with picking up that technology. I don't think we can predict that right now. I think the administration believes that they can and will.

Mr. CARNEY. You firmly support the figures that we're dealing with that?

Mr. FREMLING. Yes.

Mr. CARNEY. That was an area I was looking at, believe it or not, where we could maybe move some money around to other areas. But I appreciate what you're saying now, and I can see why you can't.

Mr. FREMLING. The changes in dollars in large part, in both the budget which I have retained and the budget which Dr. Pewitt has picked up, reflect the policy change that came with the change of administration. Even though the research which is being done is on the basic ends of the research spectrum, it is applied to the extent that it is intended to resolve problems that could inhibit the use of energy technology. If we change the mix of energy technologies which we're trying to develop, we will change the research program which is intended to support the mix.

So considerable research work and development work is not going to be done. In some technologies we will probably see a corresponding decrease in the amount of work which is being done in the environmental-support research that goes along with it.

Mr. CARNEY. Thank you.

Mr. Chairman, those are all the questions I have at this time.

Mr. SCHEUER. Thank you very much, Mr. Carney.

At this time I am going to ask a few questions on behalf of my colleague from Illinois, Congressman Paul Simon, that he has submitted to us to be asked. This is in connection with the reclamation of strip mining land that has been mined for coal.

Now, the program was supported at an annual level of $2.8 million. Apparently research is going on that would reduce the current cost of $26,000 per acre for reclaiming strip mining very substantially. Apparently they have already found ways of reducing the cost to about $16,000 per acre, and they feel when they have finished their research they'll get it down to about $13,000 per acre. The process of reclamation is required under Public Law 95-87, which requires that on completion of surface mining projects located on prime farmland, that the land be restored to its former original state. There would be vast savings in accomplishing this legislative mandate and this national goal.

There are 5 million acres, approximately, of prime farmland in the country that overlays coal, and it could be strip mined, so that in the future the impact of this small research program could be enormous and we think it ought to be continued for at least another year, or so says my colleague, Paul Simon, so I am going to ask a couple of questions on his behalf.

Why was support for this seemingly very meritorious project withdrawn?

Dr. EDINGTON. Mr. Chairman, the land reclamation program which was being conducted at the Argonne National Laboratory was essentially eliminated on a decision by the Office of Management and Budget, not because of the science, but because of the fact that they felt the Department of Interior or other Federal agencies should be supporting it, not the Department of Energy.

Mr. SCHEUER. Well, now, by the Department of Interior, do you mean through the Bureau of Mines?

Dr. EDINGTON. Yes, sir.

Mr. SCHEUER. Is the Bureau of Mines capable of carrying on this kind of research?

Dr. EDINGTON. I believe the Bureau of Mines program is directed more toward applied research.

Mr. SCHEUER. That's correct. I'm informed by Congressman Simon that they conduct applied research and that there was a

very intelligent interface between the research that was conducted by DOE and the research that is being done by the Bureau of Mines on reclaimed lands, and that it was a well thought out division of labor.

If the Bureau of Mines can't do it, if it isn't set up to do that kind of research, where else would it logically fall?

Dr. EDINGTON. The Department of Energy would certainly be prepared to make its laboratory facilities available and be pleased to work with other agencies to continues the research.

Mr. SCHEUER. In other words, what you were doing you were doing well, and it logically belonged to you. This seems to be a research project with an enormous apparent payoff. The cost-benefit ratio here is very, very positive. In effect, you're freeing up 5 million acres of prime farmland to be strip mined and then restored to prime farmland status at a cost of half or less what it costs now. This is a payoff from research that is very short termed, that is very quick, very clean and very apparent. For the life of me, I can't understand why this project has been snuffed out.

Does anybody else here have any views?

Dr. PEWITT. Sir——

Mr. SCHEUER. All right. Let me ask, how long did the Department support this project?

Dr. EDINGTON. About 5 years.

Mr. SCHEUER. In your professional opinion, was the project proceeding smoothly; was it well managed; did it seem to be a successful project with a clear payoff?

Dr. EDINGTON. Yes, sir.

Mr. SCHEUER. Well, that's our opinion, too. It seems to me one of the things that Government has done rather poorly over the last decade or decade-and-a-half that I have been around is distinguishing between projects that work and projects that don't work. We treat our successes like our failures and snuff them all out, regardless of whether all the evidence proves that there's really an attractive payoff here. This seems me to be a decision that the evidence does not support.

Does anybody have any contrary view? Yes.

Dr. PEWITT. We agree that it's a well-managed program. However, the Office of Management and Budget's decision was that land reclamation is appropriately the job of the Department of Interior and that they should make the funding priority decisions. Certainly if the Department of Interior wished to support this type of research, the Department of Energy would make available its national laboratories where we do have the capability to conduct this sort of research.

Considerable work is done at our laboratories that we call work for others; that is, work done outside the Department of Energy program areas. We certainly would be able to support this research. It was not a decision on the efficacy of the effort, but, rather what the appropriate roles were for the various agencies in Government. The decision I think was that we would not duplicate land reclamation efforts that the Department of Interior should be doing.

Mr. SCHEUER. Well, we have just heard that not only was this effort not duplicating an effort of the Department of Land Recla-

mation, but that they don't have the capability of doing this kind of research; is that correct, Dr. Edington?

Dr. EDINGTON. Sir, I can't say that they don't have the capability to do it——

Mr. SCHEUER. But I think you did say that before.

To your knowledge, do they have the capability of doing it?

Dr. EDINGTON. I thought I was saying that they were not doing it.

Mr. SCHEUER. They were not doing it?

Dr. EDINGTON. Right.

Mr. SCHEUER. As I understand it, their mission is to do very much applied research, and as I understand this project, it is a little more on the theoretical side and it's expected that they will pick up the applied research component when the knowledge base justifies that. But apparently it needs another year or two before they can really interface with the Bureau of Land Reclamation in Interior.

Is my understanding correct?

Dr. EDINGTON. I really can't answer that question, sir. I don't know.

Mr. FREMLING. Mr. Chairman, I think what is being said is that there was an attempt to get the funding in the agency which has the overall responsibility for land reclamation. The intent is not that they would actually manage the research, per se.

We are prepared, in our National Laboratory, to provide that research management function and the performance of research for them. This was more getting the funding in with the people who have the total program——

Mr. SCHEUER. Well, I suppose——

Mr. FREMLING [continuing]. Other than funding through our budget.

Mr. SCHEUER. I suppose from one point of view you might say that. From another point of view, if we're engaged in this national crash effort to achieve energy independence, and if there are 5 million acres of prime farmland that overlay coal, and if the switch from gas and oil, from Persian Gulf oil, to our own domestic coal supplies is an obvious target of opportunity for us in our national effort to achieve energy independence, then it seems to me that any research that could help facilitate the exploitation of 5 million acres of prime farmland that overlay coal, the exploitation of those inexpensively available coal resources should be aggressively pursued.

It seems to me to say that R. & D. should not be done through the agency that apparently is doing a very good job of pursuing it now, but that it should be transferred over to some agency whose real mission is very much applied research and which is not really able to take on that mission at its present state of completion, and to transfer it when it doesn't seem to be very productive. And if it's just a question of where the dollars come from, the Office of Management and Budget is overlooking the whole Federal budget the real difference is, if the dollars for a very excellent research project that's being carried on by the DOE should be derived from Interior with continuous responsibility on DOE's part to carry out the project.

All right. Why don't we leave that at this point in time and we'll confer with Congressman Simon and get back to you with any further thoughts we may have.

Let me ask you a question now about the reorganization. A change is always expensive in terms of time and dislocation and loss of focus, and unless the change clearly establishes a more rational way in which we're functioning, then we ought to see a yellow blinking light out there.

As we have discussed, on February 18 the duties of the Office of the Assistant Secretary for Environment were divided and the position abolished, and in its place the responsibilities for health and environmental research will be in the Office of Energy Research, and the newly created Assistant Secretary for Environmental Protection, Safety and Emergency Preparedness will have responsibility for the areas of environmental overview and compliance and for safety.

What effect do you think, any of you, this reorganization will have on the emphasis accorded to environment programs, environmental protection and health protection programs?

Mr. FREMLING. Mr. Chairman, the primary point in the reorganization as it impacts our specific organizational elements was the need to pull together within the agency the various energy emergency preparedness functions which were spread throughout the agency before. It was believed—and I think correctly so—that we have to have a coordinated emergency response in the event that we do have a disruption of oil supply.

The reason why those functions were pulled together in this specific office related to the fact that they are crosscutting. They go across the entire agency, as do the environmental and safety functions, and they ought not to be tied to a specific energy technology development organization or a specific operation. It is believed that there is a commonality in approach amongst the kinds of people who are involved in being safe and environmentally sound and in being ready for emergencies.

Now, that structuring, in and of itself, does not strengthen environmental protection. By the same token, we don't believe that it weakens it, either. It is expected, however, in the establishment of the structure of the office, which I am currently heading up on an interim basis, that a number of steps can and will be taken to strengthen the environmental protection and safety functions for which we're responsible. The kinds of things that I have initiated and plan to continue pursuing, and will certainly encourage my successor to continue with, will be aimed at streamlining of the processing. Perhaps this means cutting back on the numbers of actions which require a centralized processing and approval in order that we can put increased emphasis on the issues and problems which are really significant to our programs and to the American people.

I am also aiming at putting increased emphasis on the kinds of products which are put out, particularly in the environmental assessments area, which are aimed at helping with the planning of energy technology development, so that we don't find ourselves downstream with energy technologies which are ready to go but

which are then confronted with potentially adverse environmental impacts that we can't live with.

Mr. SCHEUER. This is exactly the concern we have addressed to you, and we are very, very pleased to hear that you're also concerned.

The Office of Assistant Secretary of Environment was the so-called "environmental conscience" of DOE. How will—and you've almost answered this question—this role be affected under the new reorganization and will it be strengthened, hopefully? And if so, how?

Mr. FREMLING. As I was indicating——

Mr. SCHEUER. You have.

Mr. FREMLING [continuing]. There are some strengthening actions which are already underway. I think further effort will be made to assure that we continue to have the kind of close coordination and cooperation with the environmental research arm that we have had in the past, so that it does not become a problem in the conduct of our activities.

I think there are some real pluses in moving that function under Energy Research, because this does put in one organization all of the basic energy and environmental research which is being conducted within the agency. There are commonalities between those kinds of research in that they deal with similar people, similar organizations, similar contractors and so on. So I think that is a plus, and I think we will have in place, either now or in the near-term future, management systems to assure the communication is good.

So I think the reorganization certainly does not hurt, and I think what we're doing now can help considerably.

Mr. SCHEUER. In effect, you're saying that as we proceed with research, DOE research on achieving new energy sources, we might just as well plug the environment research component right into that effort and have them conducted under one roof; is that——

Mr. FREMLING. No, that's not what I'm saying. What I'm saying is, the job of pulling together the environmental assessments to determine the kinds of impacts that might be encountered in the development of energy technologies should be done independently, but it has to be done in a cooperative mode with those who are developing the technology itself.

Mr. SCHEUER. As you know, in the past the DOE's environmental research program has from time to time come under criticism on the basis that the results of the research were really not factored into the DOE decisionmaking process in any evident way.

How will this process be different so that we can be assured that there will be integration of environmental research into the agency's ongoing decision-making processes?

Mr. FREMLING. I think there have been some of those problems in the past. But the whole thrust of what we're doing in the environmental assessments area is to come up with documents and processes related to documents such as this, called the Environmental Development Plan. This specific document I am holding relates to the advanced isotope separation program. This is an attempt to assure that integration does occur and that the research results are, indeed, used in resolving these kinds of problems; or if

the energy research is not being performed, to assure that it does get performed on a time table which will permit it to be factored into the technology development process.

Mr. SCHEUER. Do you have any other questions?

Mr. CARNEY. Yes; I would like to ask a question in relation to nuclear medicine.

The budget seems to be healthy from the standpoint of nuclear medicine in relationship to other budgets. But a question I have with nuclear medicine is, is it in DOE now because of the old Atomic Energy Commission, and not knowing where to put it when it was just in its embryonic stage? Would it be better for us—I certainly do not want to get rid of a program as important as nuclear medicine, but would we better serve everyone by taking that program out of DOE and putting it in some other Federal program that has a closer relationship to the medical field?

Dr. BURR. In response to the first part of your question, historically, of course, the nuclear medicine program did develop out of the charge in the Atomic Energy Act, to develop the peaceful uses of nuclear energy for the benefits of man. As you know, it has been a very, very successful effort. It has had a real impact on medicine. It continues to be very productive.

Now, as to where it ought to be, we have had several studies in the past, the most recent being, I believe, at the time the program was passed from the Atomic Energy Commission to ERDA. The question was again raised as to where the home should be for the nuclear medicine program. This was examined by a committee that included representatives from HEW, as it was at the time, as well as people from the university environments and actively engaged in nuclear medicine, and clinicians.

When the report was all done, it was decided that probably it should stay with ERDA. The reason for this being that it coupled very closely with some of the advanced technologies that you find in our laboratories in the nuclear area, for example, the ability to produce new isotopes with the big machines that are under the programs of Dr. Pewitt. The program benefits from this a great deal.

We have developed nuclear medicine with the philosophy that when it reaches the point of comparing the nuclear medicine procedure with alternative procedures, on a clinical basis, that this is the time that HEW, or now HHS, should become involved, in particular, assume financial responsibility. We have had a good working relationship with them.

I feel there really isn't another spot within Government that would be better for the field of nuclear medicine than having it in the Department of Energy.

Mr. CARNEY. Dr. Pewitt?

Dr. PEWITT. Having had to worry about things that work, and that are important to me, I am of the view that we should observe the principle of "if it ain't broke, don't fix it."

Mr. CARNEY. Pardon me?

Dr. PEWITT. If it's not broke, don't fix it. This is a very successful program. It has had a long history of success—approximately 50 percent of all patients who go into hospitals receive some nuclear medical treatment.

Now, that would not have happened had this program not existed. It's a small program and the taxpayers get a good return for it. It just seems inappropriate, on a program with this productivity, and with this small expenditure, to go and change it to another agency. It's not a single project; it's a program. It is an interrelated effort of a number of institutions and individuals. We have done that in a number of areas in the past, and it hasn't really contributed to improving the effectiveness of and effacacy of the effort, believe me.

Mr. CARNEY. OK. Then everyone is of the opinion that the program should stay right where it is; is that correct?

[Panel nodding affirmatively.]

Mr. CARNEY. Let me pursue that a little further.

We have a 44-bed hospital at Brookhaven National Laboratory which has a census of about one or two patients on a daily basis. Those patients are not the recipients of nuclear medicine; they are working now on a hypertension program that has been ongoing for years out there.

Why don't we utilize that facility? It's a magnificent hospital. It is set up with the most modern techniques. You have the necessary equipment there to make the radioisotopes. But yet we don't utilize the facility any more.

Dr. EDINGTON. You're correct, Mr. Carney. The Brookhaven Hospital is an excellent facility. The medical department has an excellent research program and has a sizeable portion of our nuclear medicine activities. It is used for nuclear medicine research and feasibility testing.

In addition, we utilize the nuclear medicine expertise there to assist us in helping to diagnose at an early time energy-related diseases, respiratory diseases or things of that type.

Over the past several years, three wings of the hospital have been closed down due to lack of funds, a reduction in research support. That, basically, is the situation we find ourselves in right now. In maintaining the hospital, the support comes from the research dollars in the medical department itself.

Mr. CARNEY. Is it then a problem of nuclear medicine research being a "stepchild" of high energy physics and the other activities at the laboratory, and are those other activities getting more attention in the budget than the nuclear medicine?

Dr. PEWITT. I attempted to address that in some of my remarks. We are doing excellent research. However, it's not clear at all to me that the rationale and the logic for this program have been adequately articulated within the Department, within the Executive Branch of Government, or to the Congress in the past. I intend to see that that's changed.

Mr. CARNEY. I might add that the facility has become perhaps more enhanced to do that type of research with the opening of what is to be probably the finest research hospital on the East Coast at Stoneybrook University, which is in the near proximity of Brookhaven National Laboratory. They have a 648-bed hospital over there, and they will be getting into tertiary care and a lot of research.

I would hope that if you intend to keep nuclear medicine in your shop, you would consider it a little bit more when it comes to

budgets. I say that from two very selfish standpoints: One, Brookhaven is in my district, and two, I get a thallium scan every year and I notice now through the research you have done that we can use another element rather than thallium. You can use manganese now and reduce the half-life, so that when I "glow," it will be for one-third of an hour instead of 73 hours, so that by the time I get back from Bethesda, there is no residue.

The work that we have done in this area is something that a lot of people probably don't appreciate. I wonder, however, because the work is so crucial, whether it is a stepchild because it's in DOE and it came there because of the Atomic Energy Commission—but I think you have answered the question and I hope that we, as the Congress, and you, as a group of concerned people in a department of our Government, will hopefully increase the activities at those facilities.

Thank you.

Mr. SCHEUER. Thank you very much.

The Reagan budget that was submitted to Congress on March 10 recommended a 16-percent reduction compared to the Carter budget in all areas related to environmental research. They also recommended even greater reductions in support for research related to fossil fuel, which particularly concerns me, since this is one of the areas where the conversion to coal has real promise of payoff in ridding ourselves, as I said before, of our dependence on Persian Gulf oil. Also, a greater than 16 percent reduction was promised for solar energy and energy conservation.

My question is, do the Reagan budget reductions indicate an overall redirection of priorities and goals in this area of environmental research programs? And if it doesn't, I would like some explanation of what it does mean. And if it does, I would like to hear what the new priorities and goals might be.

Mr. FREMLING. The changes that you refer to in the environmental budgets, both those that remain in our particular office and those that go to Dr. Pewitt, result from a number of factors. I don't think it reflects an overall change in philosophy with regard to the need for protecting the environment. Obviously, some of the changes that you see are a reflection of our support for the administration's effort to control inflation by constraining Federal expenditures.

Second, they reflect the change in philosophy insofar as the types of energy technologies——

Mr. SCHEUER. Can I interrupt you for a moment there?

Mr. FREMLING. Yes.

Mr. SCHEUER. One of the real driving forces fueling our national inflation is the $80 or $90 billion that we're sending overseas now for energy, for oil, and in excess of $100 billion that we will be spending next year. It seems to me that if we're all inflation fighters, looking for the targets of opportunity to reduce these inflation pressures, you would have to come up with No. 1 on the hit parade a reduction of our dependence on foreign oil, a reduction of this adverse balance of payments involved in exporting $100 billion or more of our resources overseas, and developing, as cheaply as we can, and with as little degrading effect on our environment and national health as we can, a supply of coal underneath

the ground that seems to be a 300- to 500-year supply, a vast, ready-to-be-exploited energy resource here.

Certainly from the point of view of inflation, if we can substitute $100 billion that we're sending out of the country for expenditures within our country, it should be far cheaper. I can't believe there would be any higher priority target for fighting inflation.

So to say that we're cutting this already pitifully small sum, that can help us reach this enormous resource that is sitting there waiting to be exploited, in environmentally safe fashions and in ways that will not adversely damage the national health to an unacceptable degree, is something that defies logic in my view.

How can you explain that you're cutting research to develop our domestic coal resources, our vast domestic coal resources, so that we can cut down on this $100 billion flow, in the name of inflation?

Mr. FREMLING. Mr. Chairman, there is not an indication in what is being done here that there's disagreement with the basic premise which you outline. There clearly is a need to use the coal resource in an environmentally sound manner, and other resources, if we're going to decrease our dependence on foreign petroleum.

The question is, is this a proper role for the Federal Government and can the Federal Government do it better than private industry? The administration believes that this is a role and a technology which now should be assumed by private industry, and there is a belief that they will be able to bring it into the marketplace faster; and while they're doing that, they have an obligation to do those portions of the environmental research and environmental technology that are associated with those technologies and their responsibilities for bringing them into the marketplace.

Mr. SCHEUER. Now, you say there's a belief that this kind of research could be brought to the marketplace faster under the aegis of private industry, right? And I would like to think that, and if that could happen, I would say that's probably a better way of doing it than having government doing it.

Is there any evidence from the past that industry has been enthusiastic, with zest and enthusiasm, in conducting environmentally related research? I would like to have any information you have on the history. And if that is not the case, then what kind of encouragement, what kind of mandate, what kind of administrative rules and regulations or requirements would you lay on industry to make sure they do conduct this environmental research as we stimulate them to move toward alternative sources of energy, particularly, let's say in this case, coal conversion?

Mr. FREMLING. Your question implies that I had responded by talking about a situation where we're going to back away totally. That is not the intent. The intent is that industry will be required to do the research which is necessary for the role which they now have in bringing the technology into the marketplace. But we will continue to have a role through our environmental assessment programs, through the research programs and so on, in dealing with those pollutants which could result from their operations which will not be so treated.

Mr. SCHEUER. How will you require industry to do the research?

Mr. FREMLING. The applied research related to control technology is going to have to happen if they're going to be using those kinds of technologies to meet the requirements placed upon them by the permitting authorities.

Mr. SCHEUER. You say it's going to have to happen. I mean, that's an interesting statement. When I was in law school I used to have a professor who said from time to time, when I made a remark in the course of the class discussion, "Very interesting, Mr. Scheuer, but what of it?"

You're telling us here it has to be done. We understand it has to be done. What I am suggesting is, industry has shown less than spontaneous enthusiasm in the past for spending the vast amounts of money that admittedly must be spent in producing environmentally benign systems of all kinds. For example, we still have a crushing problem, a major national problem, in how to dispose of nuclear waste.

I am not one of those who is antinuclear, on health grounds or any other grounds. Nuclear energy is probably the safest, most environmentally benign form of energy that we can produce. But we do have one terrific roadblock that has to be faced, and that is the problem of disposal of nuclear waste.

Now, I haven't seen that order of magnitude of involvement in that environmental problem on the part of industry that would really hold a light at the end of that tunnel. I must say, as far as the environmentally degrading characteristics of the internal combustion machine are concerned, over the last decade or so—I have been on the Energy Committee on the oversight of this, and I was chairman of the subcommittee that had oversight over most aspects of the internal combustion machine—it was not my observation that the automobile industry spontaneously and enthusiastically addressed itself to this problem with the order of magnitude of concern and investment that was really required.

So unless you have some kind of "stick and carrot" regulatory process up your sleeve, I wonder whether we can rely on industry in moving into this vast area of opportunity of conversion of stationary plants in this country to coal from oil and gas, whether we can rely on them, or how we can so structure this process so that we can rely on them, knowing they will have to do it.

Mr. FREMLING. I am not going to sit here and tell you that industry will spontaneously do research and development work in environmental technology and things of this sort because they like it. What I am saying, though, is that in those areas where there are commercial concerns which are involved in developing environmental control technologies for the market, and where those kinds of things are required by clean air acts and things of that sort, they can, indeed, be accomplished in the commercial environment.

The other point which I was making is the industry certainly will not take on these responsibilities when the Federal Government is doing it for them. As long as we are performing these activities which may be directly relevant to what they might be able to accomplish themselves, they are delighted to have us do it.

I don't think this is the kind of a change that is going to happen immediately. I think it's going to take some training on both sides in order to make it happen.

Mr. SCHEUER. Take some what on both sides?

Mr. FREMLING. Perhaps some training and some learning.

Mr. SCHEUER. Do you have in mind any particular device or system, or incentive or disincentive, by which we could assure the American public that as we move in this massive direction of conversion of stationary facilities to coal it will not have a significant environmentally degrading effect or health effect?

Mr. FREMLING. I do not personally, but again, I want to emphasize that we are not totally backing away from the overview and assessment of what's going on in the use of fossil resources as that increases. We will still have a very important role to play.

Mr. SCHEUER. To maintain your finger in the pie.

Mr. FREMLING. Yes, indeed.

Mr. SCHEUER. All right. I think there is very strong pressure on the part of Congress to move to alternative sources, including nuclear, including fossil, and including geothermal and biomass and all the other systems that we discussed, but I also think there's a concomitant feeling that we don't want to degrade our environment and we don't want to threaten our health, that we have enough savvy and enough science and technology know how, both in government and out, that we should be able to meet the national goal of achieving these alternative energy sources and do it in a way that won't threaten either our health or our environment. The question is, how do we get industry to make that a major element of their mission.

Well, all right. You assure us that you're concerned and you're not withdrawing and that the 16-percent reduction in your energy research budget is not going to seriously impede this effort?

Mr. FREMLING. We believe the resource is very consistent with our mission.

Mr. SCHEUER. OK.

Congressman Carney?

Mr. CARNEY. Yes. I would like to pursue that just a little further, if I may.

It was my belief that in earlier testimony you did say that you will keep up with the energy initiatives of private enterprise with these budget figures; is that correct?

Mr. FREMLING. What I said was, in those cases where private initiatives in the development of energy technologies involve an element that goes beyond those which they will have to deal with, either through requirements or for operability of the plants, we certainly will have an involvement. I referred specifically to things such as carbon dioxide, acid rain, these sorts of things, which go beyond specific plants, and which do have a major impact on whether the fossil resource will be used or not. We will continue to have a role there.

Mr. CARNEY. As I see it, you will have about a 1 percent decrease over fiscal year 1981 in biological and environmental research; is that correct?

Mr. FREMLING. That's correct.

Mr. CARNEY. And what would the overview of the whole DOE budget be? Would you have that figure handy?

Dr. PEWITT. If you exclude SPRO, and the defense programs, the overall energy portion, all other—that includes administration and

power marketing—is down net some $3 billion from the Carter proposed fiscal year 1982 budget.

Mr. CARNEY. Down from what figures, now? The Carter fiscal year 1982 budget?

Dr. PEWITT. From the Carter figures, for fiscal year 1982.

Mr. CARNEY. How much are they down? I don't think we can use those figures.

Dr. PEWITT. The decrease in the energy portion from the fiscal year 1981 Carter proposal to the fiscal year 1982 Reagan budget is, I think, 25 percent in total. The fact that this program was maintained nearly level between 1981 and 1982 in the Reagan budget is a clear indication of the Secretary's priority for this type of research. I spent a lot of hours with Governor Edwards, and believe me, he's an environmentalist and he believes in environmental protection.

Mr. CARNEY. That's precisely the point I'm trying to bring out. I think the American public is somewhat confused today when we talk about decreases in the budget in relationship to the Carter proposals. I think what you have to talk about is the relation to the fiscal year 1981 budget, not the proposed Carter fiscal year 1982 budget. The American people say, when we decrease the budget, we think we re saying in fiscal year 1981 we spent *x*, and this year we're going to drop it back 30 percent. That's not true. And particularly in this area, we have a net decrease of only 1 percent in this area, which in relationship to the entire DOE budget, I think, reflects to me a great deal of concern from Secretary Edwards in this area.

Dr. PEWITT. It reflects the priority that we give this effort. There is no doubt about that, yes, sir.

Mr. CARNEY. Thank you.

Mr. SCHEUER. Let me ask a question on the matter of interagency coordination of research.

I am very much concerned with the problem of acid rain. It's of great concern in my State. Many of the lakes in the Adirondack area are now eutrophic because of the high acid content of the water. So we not only have a problem of high acidity in our lakes, which has destroyed the fish life in half of the Adirondack lakes, we also have a problem of high acidity in our relations with Canada, because they suffer from acid rain that is produced in our country. The whole east coast suffers from the problem of acid rain. We think there's a great deal of scientific evidence that it's produced in utilities and other manufacturing sources located in the Middle West.

Now, there has been an interagency report on acid rain that I'm sure you are familiar with that involves a dozen or more Federal agencies. Admittedly, the coordination and leadership of this kind of an interagency research program is extraordinarily difficult and complicated.

I would like your appraisal. EPA, I think, has the mandate of being the lead agency.

Can you give us some information as to how that program of coordinated interagency research is working, and to what extent there is overlapping or a duplication of research in this effort as a

major problem? I think we would all be interested in having some discussion on that.

Dr. BURR. Mr. Chairman, I will address that.

Mr. SCHEUER. Before you do that, my colleague has something to add.

Mr. CARNEY. I just want to reflect my concern along these same lines, and not only my concern but that of my colleagues who unfortunately could not make the meeting today. The members of the minority had a small caucus, you might say, and tried to point out what we thought were the important aspects of the business of this subcommittee in the 97th Congress, and without hesitation, I believe that the three Members on the minority side of the aisle agree with the chairman wholeheartedly, that this problem is of great magnitude.

Congresswoman Claudine Schneider, who represents Rhode Island, has the effects of them; I, of course, come from New York and share the same concerns as the chairman does.

If I might at this time, if it would be appropriate, I would hope to ask——

Mr. SCHEUER. Let me interrupt. I don't have a problem of acid rain in my district. I'm not sure my colleague can say that. As I understand it——

Mr. CARNEY. Oh, no, I don't have a problem with it. I have one lake on Long Island, Lake Ronkonkoma, and I fish in it often. No, it's not a problem there. But we do have a problem with acid rain in New York State; we have a problem with water. I just don't know what acid rain might contribute to that problem when we talk about our reservoirs in the Adirondacks. Of course, I have to look to my neighboring friends in New York City who rely on upstate New York for water. So I share that concern equally.

I have the opposite problem—ground water contamination, not from acid rains. But I would hope that we would have further hearings on this, Mr. Chairman, and that people from DOE could come and participate in those hearings.

Mr. SCHEUER. Well, I applaud that suggestion and I support it 100 percent. It might even be that we could have a field hearing in New York and get the DOE and EPA experts to come up and actually meet with us on the site to discuss those problems.

Mr. CARNEY. Thank you, Mr. Chairman.

Mr. SCHEUER. All right. Let us hear your answer.

Dr. BURR. DOE's interest in this problem goes back to its predecessor agencies in about 1976, when we developed some programs that we felt would help us be on top of the question of acid rain. We recognized that it, along with CO_2, these are potentially being the two most important environmental problems that we had to face if we increased the use of fossil energy. That was actually recognized by a committee that was chaired by Norton Nelson of New York University, to look at the problems that might be associated with the increased use of fossil energy.

The overall Federal effort began to take shape as a coordinated effort following the President's environmental message in August of 1979, at which time the CEQ attempted to put together an interagency group to bring together all the efforts that were going

on in the Federal Government and try to develop a Federal program for the acid rain work.

Now, this was changed somewhat by the Energy Security Act of last year, which under title VII addressed the question of the acid rain problem and how it might be tackled by the Federal Government. This legislation called for an interagency group to address and to plan an overall Federal program. The work would be headed by a committee with actually three chairmen—EPA being a cochairman, Agriculture being a cochairman, and NOAA being a cochairman. Our research effort is integrated into that overall program now.

You're quite right, in January of this year although this was published I think it's still called a draft program. We participate with this group and we have been able to protect our effort in the acid rain—by "protect," I mean to provide dollars in our budget to allow us to accomplish those parts that we are assigned to do.

It will take a little time to sort out to be sure there really isn't overlap. They have identified a number of areas, and we have tried to identify what each agency is doing in these areas. But the intent is to have a coordinated effort in the Federal Government that will address these problems.

Mr. CARNEY. Right now, this year, are you satisfied with your levels? Will you be able to meet the commitments of the joint task force?

Dr. BURR. Yes, I believe we will. The program that we have in the overall effort is as we had planned to undertake this year.

Mr. CARNEY. Why do you take a level of importance somewhat less than the other three agencies, when I would think that the contributing factor to acid rain definitely is energy production?

Dr. BURR. I'm not in a position to be able to give you the rationale as to why certain agencies were selected to be the cochairmen. It is a program that we consider to be very important to the Department of Energy. As I pointed out, we have been in this for some time. We don't minimize its importance. We think we are making a contribution toward understanding it.

But as far as the rationale as to why one agency versus another should be the chairman, I can't give you that.

Mr. CARNEY. I can understand that. I was just wondering, though, because really, the whole problem is through the utilization of fossil fuels to produce energy in industry or for electricity. As I see it, that would be the major contributor to it.

Do you have a separate line budget for that program?

Dr. BURR. I probably should let Dr. Edington address this. But no, we don't split it out as a separate line. That is because the budget comes to you by divisions: The human health studies, the health effects research, ecological research, and so forth. Acid rain crosses a number of these divisions and, therefore, we don't split it out as a separate line in the budget.

Mr. CARNEY. So you couldn't put a figure on how much you're going to spend on this?

Dr. BURR. Oh, yes, we can do that. We can split the dollar figure out.

Mr. SCHEUER. Why don't you tell us what your level of expenditure is?

Dr. BURR. You go ahead, Dr. Edington.

Dr. EDINGTON. For fiscal year 1982, it would be $2.5 million, approximately.

Mr. CARNEY. What was it for fiscal year 1981?

Dr. EDINGTON. It's about $2.4 million, I believe.

Mr. CARNEY. So you had a marginal increase in that area?

Dr. EDINGTON. Yes, sir.

Mr. SCHEUER. I might add that EPA's budget for acid rain was $7.2 million in 1981, and $9 million for fiscal year 1982, which is an add on of $1.8 million. So apparently there is a value judgment in the administration that the joint research budget for acid rain should be increased somewhat, and I must say we are very much encouraged and very pleased at that priority that you're giving to acid rain research across the board.

Mr. CARNEY. I would concur with that statement for sure.

I would just like to say that, unfortunately, I cannot stay any longer. I have another commitment this afternoon which I must make. But I appreciate these five gentlemen coming down today on these preliminary budget hearings and providing us with the budget information that you did. I would look forward to having an opportunity to talk with you again in the future on some of the programs and the direction that we will take in DOE in the areas that are of concern to this subcommittee.

I thank you very much, and I apologize for having to leave at this time. I think everyone is aware of everyone's calendar at this time of year during the budget.

Thank you very much, and thank you, Mr. Chairman, for conducting these hearings.

Mr. SCHEUER. Thank you for joining us, Congressman.

Actually, I think that concludes most of the questions on the board issues of public policy that have concerned us. We have some additional questions that are a little bit more technical and perhaps we'll submit them to you in writing.

I want to thank all of you for coming down. It has been a very constructive and useful hearing. I want to thank you for your forthcoming attitude, and Dr. Pewitt, we will look forward to having you as well as the others down in another couple of weeks, and we will call you informally to find out when you're ready. By and large, we are expecting great things from you and I don't believe we are going to be disappointed.

So with repeated thanks for your coming here this morning, we will adjourn this meeting.

[Whereupon, at 11:45 a.m., the subcommittee was adjourned.]

[Additional questions and answers submitted for the record follow:]

1. In the Accomplishments for Environmental Assessments on page 5, the statement is made that "an environmental and regulatory impact analysis of the proposals for a synthetic fuels development program was published." Didn't this report raise more questions than it answered? If so, what research will be done to provide answers to the research?

The environmental and regulatory assessment of the synthetic fuels development program was published in June 1980. It was the first integrated and comprehensive assessment of the programmatic environmental and regulatory aspects and issues associated with the synthetic fuel program proposed in July 1979 and enacted in June 1980. To date, there has not been any other fossil fuels conversion process analysis conducted which has been as comprehensive.

Some questions concerning environmental and regulatory issues are identified, which was one of the assessment's objectives. Some of the issues raised are being examined within the Department, both by program units and by the Office of Health and Environmental Research. In addition, the National Petroleum Council is using the assessment as a basis for an updated independent analysis of studies they view necessary to fully understand the environmental implications of synthetic fuels. The NPC analysis is designed to provide the Department of Energy and the energy production industry independent advice on the environmental issues and concerns associated with petroleum, natural gas and synthetic fuels production. Together, these assessments will provide a basis for further issues analysis, research and regulatory revisions which are necessary to support domestic energy production, as the information base and project plans continue rapid change.

2. Also on page 5, "an analysis of the potential energy-related sources, atmospheric transport, deposition and effects of acid rain" was prepared and issued. Didn't the report conclude that acid rain is a localized problem which is contrary to most research results? Is this a valid report based on scientific research or is it a computer model based on theoretical data?

In December 1980, the Office of Environment published a draft report, the "Acid Rain Information Book." The purpose of this report was to present, in an objective fashion, a review of available information on sources of acid rain, atmospheric transformation and deposition of acid pollutants, and effects of acid rain. The report also identified key areas of uncertainty related to acid rain. The report did not conclude that acid rain is a localized problem.

Many of the facts included in the report were based on the finding of scientific research. Computer models were used in one section, "Deposition," in order to get some rough estimates of long-range transport problems.

4. In two areas activities will be performed by in-house staff. The staff is overworked now. Who will conduct the planning and analysis activities suggested in the statement on page 10? Will resources from other projects be reallocated?

As far as former ASEV planning activities are concerned, efforts will be focused better to address major issues and thus utilize the staff more efficiently. In the case of assessments and analyses activities, the workload will be partially reduced by the Administration's reduction in the burden of Federal regulations and by the technology offices undertaking some of the analyses in their specific areas of program responsibility.

6. Under NEPA activities (page 3) you discuss a program to streamline the environmental review activities for energy-related projects. "This has been well received and other states have requested similar assistance from DOE." But on page 10 under Discussion of Change you state that "Grants to states for the implementation of a streamlined Federal, State and local permit review process will be terminated." Why are you terminating a well received program? If the program is successful in cutting red tape shouldn't it be continued?

The program was apparently well received and because this process streamlined environmental review activities other states now have available these results and can implement this process without Federal assistance. We believe the joint review process can be implemented without further specific Federal support.

7. In the Environmental and Safety Engineering program (p. 6) you state that "unbiased evaluations are used to establish environmental, engineering and economic trade-offs among various environmental control options." Yet in the next paragraph you state the "Experimental tests conducted ... have shown that heat radiation from LNG pool fires on water can approach levels up to twice those previously estimated." Could you explain how "unbiased evaluation" could lead to "levels up to twice those previously estimated?" It would appear that more emphasis should be placed on experiments in the lab and less on theoretical models. Would you respond to that observation?

We agree entirely that more emphasis needs to be placed on collection and analysis of experimental data, and less emphasis on developing theoretical models or rehashing data already available. As stated on page 5 of my testimony, a major goal of the Environmental and Safety Engineering program is to collect new data in the laboratory and field and determine, in an unbiased fashion, the implications of this data to environmental control and safety aspects of energy systems. With respect to LNG, it was data from our field experiments that demonstrated heat radiation from LNG pool fires is twice that previously estimated. The previous estimates made by others were based on extrapolating data from small scale tests using theoretical models. As you suggest, the pure theoretical approach has its limitations, and needs to be balanced by sufficient emphasis on experimental data collection. We feel the Environmental and Safety Engineering program is well designed in that its primary emphasis is on new and confirmatory data collection and evaluation.

An internal audit by Kenneth Mansfield, from DOE's Inspector General Office, as reported in the Chicago Tribune (by James Coates) earlier this year, explained that "about $55 million of the Department's expensive machinery used by contractors was lost because the Energy Department failed to keep a record of its whereabouts. Lost items included... a $169,000 computer, plus tons of laboratory equipment and a synchrotron used in high-energy physics experiments." Was any of this equipment under the responsibility of any labs conducting environmental research?

As far as we have been able to determine, the University of California San Francisco Laboratory of Radiobiology was covered by this report. In that particular case, it was not a question of equipment being lost but there was a problem with identifying Government owned equipment which had been comingled with university equipment.

Are there any requests for new equipment to replace any "lost" items?

No equipment funding is requested to replace any items referred to in the audit. I believe it was really a matter of discrepancy in records and not truly equipment which had been "lost."

What is being done to tighten the accounting process to prevent future reoccurrences of this?

After issuance of this report the Headquarters Procurement and Controller Offices have taken steps to instruct all contracting offices to strengthen their efforts to make sure that DOE and their contractors are in agreement regarding the proper accounting for all equipment items.

1. Mr. Pewitt, you mentioned interagency coordination (p. 5) in your testimony and we have some information on the basic structure and functions of these various coordinating task forces. However, we do not have evidence that they are saving dollars while producing more efficient research projects. Could you give us examples of research projects that the Department of Energy had planned to conduct but did not because some other Federal agency was conducting the research. Do you have any estimate of the total number of projects that have been dropped or picked up because of information received from interagency coordinating groups?

We make every effort to coordinate programmatic activities with other agencies during the research planning stage. In this way, we try to assure that our research is not only targeted on important concerns facing the Department, but also truly complimentary to activities planned, or underway, in the other agencies. I would like to provide, for the record, some additional information which will exemplify these coordinated activities.

Because of this interagency coordination, projects are not typically dropped or picked up. Rather, general areas of research are identified with particular agencies. I will be pleased to provide a number of examples in the additional information to be submitted for the record.

These include the two steam plant projects described above. The process of identifying pollution control needs is a continuing and ongoing process. Funding for projects is sought from Congress on a priority basis to assure that the more significant control needs are addressed at the earliest possible time. Congress authorized sufficient funds in 1979 and 1980 to start 29 of the 57 projects. Funding sufficient to start an additional 13 of the projects was requested by DOE in FY 1981. Funds for the remaining 15 projects are being sought either in FY 1982, FY 1983 or FY 1984.

Examples of Interagency Coordination

The Department has kept its efforts on health and environmental effects of criteria (regulated) pollutants to a minimum in view of interagency guidelines developed through the OMB that indicated this area of research was the primary responsibility of EPA. Similarly, we have restricted our conventional combustion-related chemical characterization and toxicology research and have given major emphasis to health and environmental effects of synfuel technologies.

Research has not been initiated on lead toxicity in relation to the large-scale deployment of advanced lead-acid batteries in electric vehicles and as load-leveling devices in electric power delivery systems in view of existing activities underway elsewhere, notably, EPA.

Our diesel program has not included research on skin-tumor induction (skin-painting studies), specific locus mutations in mice, nor adverse effects on functional systems other than the respiratory tract. These activities are being pursued by EPA.

The budgets of the agencies for acid rain research were developed and coordinated by the Interagency Task Force on Acid Precipitation to reflect agency needs and expertise and to minimize duplication of effort. As a result, the DOE program will emphasize deposition processes, source-receptor analysis and integrated natural ecosystem studies since other agencies are not working in these areas. In the research area of atmospheric processes, NOAA will address the global distribution of acid rain and the relative role of natural sources. Effects research will be supported by DOA and DOI, with DOA emphasis on agricultural crops, soils and rangelands. DOI will address water resources, forest resources, and monitoring. EPA research is broad-based and highly oriented to assessment studies to define potential regulatory needs.

The Interagency Committee on Carbon Dioxide and Climate coordinates the research activities in this field and has accomplished a number of savings. One of the important areas of the research program is that dealing with the measurement and interpretation of atmospheric concentrations of carbon dioxide. DOE, which has been designated lead agency and chairs the committee, determined that this work was being carried out at NOAA although at too low a level to be effective, and that it would be more cost-effective to increase the NOAA effort than to build a DOE program. DOE assigned responsibility for these measurements and interpretations to NOAA, and then helped NOAA in obtaining funds to conduct this research. By avoiding duplication, about $1 million per year was saved in the DOE budget.

Another instance is in the important area of climate modeling. There are three agencies that sponsor major programs in climate modeling research; NOAA, NSF, and NASA. Rather than begin a separate and new major effort, DOE chose to supplement the existing programs to the extent necessary to address specific carbon dioxide-related issues.

2. What are the areas in which interagency coordinating groups shoud be established?

In addition to the agreements I have already mentioned, it may be desirable to establish another formal agreement in the area of synthetic fuels research.

Since early 1978, DOE/EV has convened quarterly meetings with EPA, NIOSH, and the Department's Office of Fossil Energy to review and comment on the development, implementation, and status of the detailed research assessment program for the low BTU Gasifiers-in-Industry facilities sponsored by DOE. Other detailed R&D plans for health and environmental assessment of H-Coal and SRC have also been addressed.

This group is now being transformed into an Interagency Working Group on Coal Gasification and Liquefaction to review progress in all relevant DOE sponsored activities. EPA and NIOSH field program managers for coal gasification and liquefaction as well as program managers from the Office of Fossil Energy will participate. It is expected that this forum will also serve as a vehicle for information dissemination on progress and program commitments by EPA and NIOSH as well, and provide a basis for improved program planning and prioritization of needs for each agency.

In addition, the current effort by EPA to give increased focus to synthetic fuels research will call for even closer coordination of the research programs to be sure that gaps will be minimal, and unnecessary overlaps will be avoided.

3. **The Environmental Protection Agency has reduced its fund request, compared with last year, in the area of energy-related research. Will the Department reevaluate its research program to reflect this change?**

Yes, we will. The substantial reduction projected for the EPA program in FY 1982 will have a significant impact on the Federal program of research on health and environmental impacts of energy technologies. Areas of research to be curtailed include health effects of inhaled primary and secondary pollutants from coal combustion, development and validation of bacterial and mammalian cell assay systems for pollutants associated with fossil fuel combustion, and aquatic effects, including Great Lakes research, of conventional coal combustion. A significant portion of the EPA reduction will involve research conducted in DOE laboratories. This research was transferred to EPA in FY 1979 at the request of OMB. EPA agreed to emphasize energy-related research on regulated pollutants and conventional technologies while DOE was to emphasize research on unregulated pollutants and advanced fossil-energy technologies.

The termination of many projects of high quality and importance to core programs in DOE laboratories raises practical questions concerning what can be done to retain the affected expertise within the energy-related program. We have already begun to address these questions, but a systematic assessment of impacts and options that remain will take time. Programmatic impacts associated with reduction in the EPA in-house research effort and in EPA support of research conducted by NIEHS, NIOSH, TVA, and other agencies will also have to be assessed. Informally, we have obtained preliminary information on research to be affected by the EPA reduction with more detailed information at the project level to be provided when final EPA program priorities are established.

1. **Do the Reagan Budget reductions indicate an overall redirection of priorities and goals in the area of environmental research and programs? If so, what are the new priorities and goals?**

The new Administration's approach toward energy technology includes a movement toward Federal Government involvement in the longer term, high risk technologies while turning to industry for the development, commercialization, and use of those technologies which are in the shorter term and more ready for commercialization.

Even though the environmental research programs are on the basic end of the spectrum, they are applied in the sense that they are aimed at removing impediments from developing energy technologies. Therefore our program does track what is going on in the energy technology area to a certain extent. There will be changes in our programs toward increased work in some of the longer range technologies and some decrease in fossil, solar, and conservation.

2. What criteria does the Department use in determining which projects to cut and what to support? Please give examples in both areas.

The Administration's support is provided to projects which: reflect realistic energy pricing, such as decontrol of oil to reach world market levels; support enhancement of oil stockpiles to deal with disruption in world markets; eliminate subsidies for domestic energy production; reform regulatory policies for coal which reconcile energy, environmental and other national objectives; resolve regulatory problems which inhibit the use of nuclear power; and which refocus the Government's role in energy research and development in many areas to emphasize long-term, high risk activities.

Examples of the Department's support for projects which reflect these criteria are: growth in the budget for funding Defense Activities and the Strategic Petroleum Reserve; increased support for General Science Activities which encompass basic research on the fundamental structure and behavior of matter; redirection of the fossil, conservation, and renewable resource programs away from demonstration and commercialization; and concentration on long-term high risk research and development activities while permitting the Synthetic Fuels Corporation and industry to demonstrate and commercialize energy technologies.

2. **On the bottom of page 6, a reference is made to toxicity resulting from acid rain which leaches aluminum from the soil. The conclusion drawn is that the fish kill that results require control of the aluminum. This does not seem to be very realistic. Aluminum is one of the most abundant metals in the earth's crust. The problem is caused by the acid rain. Would you comment on the validity of your accomplishment? Shouldn't the research be aimed at stopping the oxides of sulfur and nitrogen which are probably the causing agents.**

Certainly, aluminum is one of the most abundant elements in the earth's crust, but the chemical and biological activity of elements determines their significance to environmental chemistry. In the case of aluminum, it forms complexes in nature which are among the most stable and, therefore, least soluble. Only an extremely small fraction of the aluminum in nature is biologically available, but aluminum solubility is highly dependent on pH. The objectives of the research in question was to examine the effects of acid rain on soil processes, not effects on lakes. Yet, one of the early findings was that acidic inputs into soils, typical of those which have developed in the mountainous regions of New England, leads to accelerated leaching of aluminum which accumulates in the high altitude lakes. The increase in biologically active forms of aluminum appears to be the principal cause in the decline of fish populations. We feel that this knowledge will be important in development of solutions to the problem of the decline of fish populations and the development of a strategy to deal with the acid rain issue. Clearly, acid rain can be reduced by control of oxides of sulfur and nitrogen, but it is important to recognize that even if total control could be achieved, immediate recovery of the ecological balance in the affected lakes would not follow. In fact, it might never occur as a result of the acidification of soils in the area which are not well buffered.

Aluminum will continue to leach from these soils until the acidified soils are neutralized either through natural processes or through the application of lime or other neutralizing materials, a practice common in agriculture.

Indeed research is needed which may discover more cost-effective methods for control of oxides of sulfur and nitrogen. However, absolute control; i.e., zero emission levels, is not practical and probably not possible. Therefore, one of the first questions we face is what level of control is acceptable, and to answer that objectively we need to know what are the benefits and the environmental costs of various levels of control. For years, scientists and funding agencies aimed their research on the effects of the acute, short-term effects of atmospheric pollutants. The current standards are effective in avoiding such impacts. Unfortunately, it is beginning to appear that the total, cumulative input of pollutants to the environment is perhaps the most critical factor which underscores the importance of understanding the many diverse processes; such as, aluminum leaching that are involved.

In 1980, two DOE-owned plants had not completed their environmental pollution abatement projects relating to reduction of particulate emissions. The plants were in Oak Ridge, Tennessee, and Richland, Washington. What is their current status and are there currently other DOE facilities not in compliance with Federal regulations? What do you plan to do about their situations?

The Y-12 Steam Plant at Oak Ridge has operated under notice of violation, particulate emissions, since November 1978. In FY 1980, Congress authorized installation of emission controls but appropriated no funds. In FY 1981, Congress appropriated $2 million for design of emission controls. Design is under way and is scheduled to be completed in January 1982. The DOE Defense program has requested construction funds in the FY 1982 budget. Assuming construction funds are provided as requested, two boilers can be brought into compliance by December 1984 and the two remaining boilers would be in compliance by December 1985. The total estimated cost is $17 million.

The Richland, Washington Steam Plant particulate emissions control project is 95 percent complete and is now scheduled to start operating in April 1981. Strikes by construction workers during 1980 caused construction to be delayed beyond the original August 1980 start up date. This project is funded by the DOE Materials Production program.

Pursuant to its responsibilities under Executive Order 12088, Federal Compliance with Pollution Control Standards, the Department has identified 57 pollution control projects needed to bring DOE facilities into compliance with recently promulgated local, state, and Federal environmental laws.